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A Fertility Decline in Kenya

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Table of Contents

		Page
Update		2

Articles

Evidence of a Transition to Lower Fertility In Kenya	Anne R. Cross, Walter Obungu and Paul Kizito	4
Estimating Abortion Levels in Brazil, Colombia and Peru, Using Hospital Admissions and Fertility Survey Data	Susheela Singh and Deirdre Wulf	8
Effect of Family Planning Program Components on Contraceptive Acceptance in Four Indian States	K. Srinivasan, P. C. Saxena, T. K. Roy and R. K. Verma	14
Premarital Sex in Costa Rica: Incidence, Trends and Determinants	Luis Rosero-Bixby	25

Digest

Trinidad and Tobago: Users of Reversible Methods Prefer Pill or Condoms	30
Weekly Testosterone Injections May Provide Effective Contraception	31
Three in Four Jamaican Pregnancies Are Either Mistimed or Unwanted	32
Poor Health Care Leads to African Women's High Rates of Uterine Rupture	34
Contraceptive Practice Doubles in Nigerian City Over a Five-Year Period	35
Rhythm Accounts for Half of All Contraceptive Use in Bolivia, DHS Reveals	36

Books in Review

Two Views of Childbearing in India	Leela Visaria	38
Note to Authors		40

The cover illustration is based on a poster from a family planning center in Kenya. The Swahili means "This mother needs to space her births."

UPDATE

The Fertility Necklace

Women in Cote d'Ivoire are being taught how to keep track of the fertile and infertile days of their menstrual cycle by using a color-coded beaded necklace.[1] Over three years ago, organizers of a primary health program in Abidjan created a 28-bead necklace that would help patients keep track of their menstrual cycles. The first five stones, which are red and smooth, signify the bleeding days of the cycle; these, along with the five neutral-colored, rough-textured beads that follow, represent the typical 10-day period at the beginning of the menstrual cycle during which conception is unlikely. The next four green beads and four blue beads stand for the days just before and after ovulation, when conception is more likely to occur. The remaining 10 beads, also a neutral color, again represent days on which conception is less likely. Use of the necklace by itself is not recommended as a method of contraception, but it has proved helpful in educating women about the concept of the fertility cycle, and can particularly aid women seeking pregnancy who want to know when they are most likely to become pregnant.

[1] "Teaching by Necklace," *People*, Vol. 17, No. 4, p. 28, 1990.

Maternal Deaths in an Indian State

There are approximately eight maternal deaths for every 1,000 live births in a poor district of Andhra Pradesh, according to the results of an intensive investigation of maternal mortality.[1] Such deaths accounted for 36 percent of all mortality among women of reproductive age. Rates were substantially higher in rural parts of the district than in urban sections (8.3 deaths per 1,000 live births vs. 5.4 per 1,000), and were four times higher in poorly developed villages than in more highly developed villages. Sixty-three percent of the 284 maternal deaths for which detailed information could be obtained followed live births (often because of prolonged labor), 14 percent were related to stillbirths, 13 percent were associated with nondelivery factors and 10 percent followed abortions. Two-thirds of all maternal deaths had a direct obstetric cause; the most common causes were sepsis (36 percent), hemorrhage (12 percent), eclampsia (nine percent) and retained placenta (seven percent). More than half of all maternal deaths occurred either at home or on the way to the hospital. The investigators conclude that 80 percent of the deaths could have been prevented by prenatal care, treatment of preexisting health problems and timely medical treatment.

[1] J. C. Bhatia, "Light on Maternal Mortality in India," *World Health Forum*, **11**:188, 1990.

Truth in Family-Size Preferences

Many Chinese women appear to underreport their preferred family size in face-to-face interviews.[1] Data from a 1985 survey in Shanghai that was conducted in the standard manner were compared with those from a 1983–1984 survey in which respondents could complete the questionnaire privately and then mail it back or return it anonymously. Six percent of respondents to the 1985 survey reported wanting three or more children, compared with 24 percent of respondents to the 1983–1984 survey, with these differentials being especially great among less educated women and among women living in rural areas. Much of the misreporting appeared concentrated among women who had already borne three or more children: In the face-to-face survey, 61 percent reported that they preferred a two-child family, but in the 1983–1984 survey, 61 percent said they preferred three children, and most of the remainder wanted four or more. The investigators observe that "it is fair to assume that underreporting on this measure is general throughout China," and that the results of research using family-size preference data collected in face-to-face interviews may be misleading.

[1] A. I. Hermalin and X. Liu, "Gauging the Validity of Responses to Questions on Family Size Preferences in China," *Population and Development Review*, **16**:337, 1990.

Reversing Vasectomy in Nepal

The vast majority of men in Nepal seeking reversal of their vasectomy did so because one of their children had died; the investigators comment that in many of these instances, the need for reversal might have been avoided if providers had properly screened sterilization candidates. About 50 percent of the 157 men who had their vasectomies reversed between 1980 and 1985 did so because a son had died, and another 22 percent did so because a daughter had died. Only 10 percent sought reversal because they had remarried after their sterilization. On average, the men who sought reversal as a result of the death of a child had been about 35 years old when they obtained their vasectomy, around two years younger than the mean age of all sterilized men in Nepal. Likewise, they had an average of 2.3 children, about two children fewer than is typical among vasectomy acceptors in Nepal, and they were much more likely to have had a child two years old or younger at the time of the vasectomy. The authors of the study point out that infant mortality in Nepal is fairly high, and that couples who are sterilized when their last child is very young may still be at high risk of child mortality. "More careful screening of men seeking vasectomy," they conclude, "could reduce the demand for vasectomy reversal considerably."

[1] S. Thapa and T. M. Vaidya, "Vasectomy Reversal in Nepal," *Journal of Biosocial Science*, **22**:423, 1990.

Ugandan AIDS Toll Projected

Computer projections indicate that despite Uganda's very high birthrate, the size of its population may remain almost unchanged over the next 25 years if the nation's AIDS epidemic is not checked.[1] Uganda's total fertility rate over the period 1985–1989 was 7.3 lifetime births per woman,[2] and the computer model showed that in the absence of the AIDS epidemic, the population would be expected to rise from about 16 million in 1990 to around 32 million by 2015. However, an estimated one million Ugandans are currently infected with the human immunodeficiency virus, and if the epidemic continues at its present rate, Uganda's population might total as few as 20 million people in 2015. (The projected loss of 12 million people represents those who would die of AIDS as well as those who would never be born because of the premature deaths of men and women of childbearing age.) The model also indicates that AIDS-related mortality might leave Uganda with as many as 5–6 million orphans by 2010. The Futures Group researchers who developed the model noted that Ugandans seem to be well-informed about AIDS as a result of information and education programs, but have done little to change their behavior. The presentation of these data reportedly convinced Uganda's president, Yoweri K. Musaveni, to reverse his opposition to widespread condom distribution.

1. J. Perlez, "Spread of AIDS Is Worrying Uganda," *New York Times*, Jan. 30, 1991, p. 4.
2. E. M. Kaijuka et al., *Uganda Demographic and Health Survey, 1988/1989*, Ministry of Health, Entebbe, and Institute for Resource Development/Macro Systems, Inc., Columbia, Md., Oct. 1989.

Immunizing the Developing World

The degree to which very young children are immunized against certain serious diseases varies widely around the developing world. According to data from 21 countries surveyed as part of the Demographic and Health Surveys project,[1] the proportion of children between one and two years of age who are fully immunized (i.e., against tuberculosis, diphtheria, pertussis, tetanus, polio and measles) drops from 78–81 percent in Botswana, Tunisia and Zimbabwe to 14 percent in Liberia, 10 percent in Senegal and four percent in Mali. Most common is tuberculosis immunization, with anywhere from 38 percent (Mali) to 98 percent (Sri Lanka) of 1–2-year-olds immunized. Combined diphtheria, pertussis and tetanus injections, which must be given in three stages (usually between six and 14 weeks after birth), are often begun but not completed: In Bolivia, Guatemala, Liberia, Mali, Mexico and Senegal, less than half of all babies who had received their first such injection received the series of three by their first birthday; in contrast, coverage was virtually complete in Botswana (95 percent), Sri Lanka (93 percent) and Tunisia and Zimbabwe (92 percent each). There appears to have been a steady increase over the past decade in most types of immunization, particularly in Africa. Nevertheless, the authors observe, "the target of 80 percent immunization coverage by 1990 for all children at their first birthday will [have been] reached by only a few of the countries included in this report."

1. J. T. Boerma et al., *Immunization: Levels, Trends and Differentials*, Demographic and Health Surveys Comparative Studies No. 1, Institute for Resource Development/Macro Systems, Inc., Columbia, Md., Dec. 1990.

A Slimmer Copper T

A modification of the Copper T IUD that is intended to make the device simpler to load into its inserter and easier to insert may actually have no important insertion advantages over the standard Copper T, according to a recent report.[1] About 300 women obtaining an IUD from clinics in Brazil, Chile, the Dominican Republic, Egypt and Sweden received the standard TCu 380, while around 700 received the modified device, called the Slimline. Its major modification is that the copper sleeves on the horizontal arms are flush with the plastic rather than raised, and are at either end of the arms rather than in the middle. Providers reported no difference in the ease of loading the Slimline into the inserter tube or of inserting it, and the women reported no difference in the amount of pain experienced during insertion. There was also no difference between the two IUDs in 12-month pregnancy rates, and although the Slimline was associated with a slightly higher expulsion rate than was the standard IUD, the difference between IUDs was not statistically significant. The investigators observe that while "a handful of cases suggest that the Slimline may be easier to insert than the standard model in women with small cervical canals, . . . this study did not demonstrate any clear differences either in ease of insertion or in pain associated with insertion."

1. I. Sivin et al., "A Randomized Trial of the Gyne T380 and Gyne T380 Slimline Intrauterine Copper Devices," *Contraception*, **42**:379, 1990.

Will Malay Policy Alter Birthrate?

Nine in 10 Malaysians do not plan to have any more children than they originally desired, despite their government's efforts to encourage larger families.[1] A 1983 policy intended to slow the decline in the nation's birthrate was aimed at convincing Malaysians to have more children, but a 1984–1985 national probability survey showed that just 10 percent of women said the policy had led them to want more children, with only 15–17 percent saying they might do so if the government offered free child care or educational aid. Ethnic Malay women, though, were five times as likely as non-Malays (generally Chinese or Indian) to say that the policy might affect their fertility. The researcher observes that ethnic Malays already have, and want, substantially larger families than do non-Malays, and that their birthrate and family-size desires rose in the early 1980s. Given that ethnic Malays represent about three-fifths of the childbearing population, he suggests that the policy may prove more successful than might be expected based on the seemingly poor public response.

1. G. L. Khor, "Fertility Preferences Among Malaysian Women: An Analysis of Responses to the New Population Policy," *Journal of Biosocial Sciences*, **22**:465, 1990.

Lactation, Menses and Ovulation

Breastfeeding women who begin to menstruate within six months of delivery are not likely to ovulate for weeks, and thus are not at immediate increased risk of accidental pregnancy, a small Philippine study shows.[1] However, after six months postpartum, they often ovulate either before first menses or shortly after. Postpartum amenorrhea averaged 31 weeks among 40 breastfeeding women, but first ovulation occurred an average of 37 weeks postpartum. Over half of the women first menstruated within six months of delivery, but 67 percent of these did not ovulate until at least one month later, and ovulation followed menses by an average of 16 weeks. Among lactating women who first menstruated after six months postpartum, 78 percent ovulated before their first menses, and the remainder ovulated an average of only seven weeks later. The study shows that in the first six months postpartum, resumption of menses is not necessarily an accurate marker for ovulation in women who are breastfeeding.

1. S. S. Eslami et al., "The Reliability of Menses to Indicate the Return of Ovulation in Breastfeeding Women in Manila, the Philippines," *Studies in Family Planning*, **21**:243, 1990.

Evidence of a Transition to Lower Fertility in Kenya

> **"There were large differentials in contraceptive use among the 13 districts covered. . . . These findings indicate that there are pockets of contraceptive use in Kenya that reach levels as high as those found in more developed countries."**

By Anne R. Cross, Walter Obungu and Paul Kizito

Summary

Data from the 1989 Kenya Demographic and Health Survey provide evidence that the country's population growth rate, historically among the highest in the world, has begun to slow. The total fertility rate in 1989 was 6.7 live births per woman, down from 8.1 in the mid-1970s; most of the decline appears to have taken place in the past few years. Contraceptive prevalence has increased sharply, with 27 percent of married women using a method, up from 14 percent in 1984 and six percent in 1977–1978. Periodic abstinence remains the most widely used method (7.5 percent), followed by the pill (5.2 percent) and female sterilization (4.7 percent).

The survey results suggest that the fertility decline is likely to continue. The average ideal family size in 1989 was 4.4 children, down from 5.8 in 1984. Half of currently married Kenyan women say they want no more children. In addition, more than half of recent births were either mistimed or unwanted. More than one-third of currently married women aged 15–49 are in need of family planning, 22 percent for spacing and 14 percent for limiting births.

Introduction

For the past decade, Kenya has repeatedly been cited in professional journals and the popular media as having the highest rate of population growth of any country in the world (about four percent per year). This rate, which would lead to a doubling of population every 18 years, resulted from two factors: Over the two previous decades, mortality had fallen to one of the lowest levels in Africa and fertility had risen to an extremely high level (eight lifetime births per woman, or a crude birthrate of 52 births per thousand population).[1]

Kenya's government became concerned about the effects of rapid population growth even before that growth reached its highest level. In 1966, Kenya became the first sub-Saharan African country to adopt an official population policy favoring reduced fertility; it stated that the government would "pursue vigorously policies designed to reduce the rate of population growth through voluntary means."[2] A year later, the government launched a national family planning program that integrated contraceptive services into maternal and child health services.

Although the goal of the 1975–1979 phase of the program was to reduce the annual rate of natural increase from 3.3 percent in 1975 to 3.0 percent in 1979, the 1979 census results showed that the rate of population growth had actually increased to 3.8 percent per year.[3] In response to this increase, the government established the National Council for Population and Development (NCPD) in 1982 to formulate government policies and strategies and to coordinate all population-related activities. The NCPD has also been a channel for donor funds for population-related activities, which have increased considerably over the past decade.

Given an active but somewhat depressed economy, a relatively stable political situation and the increasing education of women, the government expected its policies to result in fertility decline. Nevertheless, although the 1984 Kenya Contraceptive Prevalence Survey (KCPS) showed an increase in the level of contraceptive use, the reported decline in fertility was small (from 8.1 to 7.7 births per woman), and the data showed an increase in the average number of children ever born to women in all age-groups.[4]

In 1989, the NCPD conducted the Kenya Demographic and Health Survey (KDHS). Between December 1988 and May 1989, a total of 7,150 women aged 15–49, and the husbands of 1,116 of those women, were interviewed in their local languages. The sample of women was representative of 95 percent of the country's female population of reproductive age and was designed to produce estimates by province and for the rural areas of 13 of the country's 41 districts.* Female interviewers collected complete birth histories from the women, along with information on the women's knowledge and use of family planning methods and on indicators of maternal and child health. The questionnaire also included other variables that affect fertility levels, such as marital status, breastfeeding and postpartum abstinence.

Descriptive results from the KDHS show that the sample was indicative of the young population that results from high fertility;[5] the majority of the women were under 30 years old. Two of every three respondents were currently in a marital union, defined loosely to include consensual and traditional unions as well as formal marriages. One in four respondents had never been to school, while just over half had had some primary education, and one in five had had some secondary education. Young women were more likely than older women to be educated: Only five percent of women aged 15–19 had not been to school, compared to 65 percent of those aged 45–49.

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*Northeastern Province was excluded from the survey. A more detailed description of the sample and survey design is provided in the complete KDHS report. (See: reference 5.)

Fertility Trends

Because Kenya has had three surveys in the past 12 years, we can study trends in fertility over time (Table 1). A comparison of data from the 1977–1978 Kenya Fertility Survey,[6] the 1984 KCPS and the 1988–1989 KDHS shows that the total fertility rate declined from a high of 8.1 children per woman in 1977–1978 to 7.7 in 1984 and 6.7 in 1989, a total decrease of 17 percent. In fact, because of the different reference periods used in the surveys, the 1984–1989 decline of 13 percent actually took place over a three-year period (late 1983 to late 1986).* This is an extremely rapid, though plausible, decline in fertility. If these figures are accurate, the crude birthrate in Kenya declined from about 52 per thousand in 1979 to about 42 per thousand in 1989.†

Even without comparison to other survey results, KDHS data provide convincing evidence of a decrease in fertility. First, age-specific fertility rates based on birth histories show a decline over the past decade or so, and the decline is somewhat greater between the periods from 5–9 years and 0–4 years before the survey than between the periods from 10–14 and 5–9 years before the survey. Second, in both the KFS and the KCPS, the number of children aged 0–4 was about 15 percent larger than the number aged 5–9, but in the KDHS, it was two percent smaller. Finally, the proportion of women who reported being pregnant at the time of their interview declined by 29 percent, from 13 percent in 1977–1978 to 11 percent in 1984 and nine percent in 1989. All these data indicate that Kenya's fertility has declined.

The fertility decline varied considerably among provinces. A comparison of the 1977–1978 KFS data with the 1989 KDHS data in Table 1 shows declines in all provinces except Western Province, where fertility remained constant. (Current fertility levels in Western Province appear to have been underreported in the 1984 KCPS.) Major fertility declines, ranging from 21 percent to 30 percent, occurred in Central, Nairobi, Coast and Rift Valley provinces. For example, fertility in Central Province fell from an average of 8.6 to 6.0 children per woman over 11 years. KDHS results show that as fertility declined, the differentials among provinces increased. In 1977–1978, women in Rift Valley Province had an average of 2.7 more live births than their counterparts in Nairobi (8.8 vs. 6.1); this difference between the provinces with the highest and the lowest fertility had increased to 3.5 births by 1989 (8.1 in Western Province vs. 4.6 in Nairobi).

Table 1. Total fertility rates among women aged 15–49, by province, according to survey; and percentage decrease, by province, Kenya, 1977–1989

Province	1977–1978 KFS	1984 KCPS	1989 KDHS	% decrease 1977–1989
Total	**8.1**	**7.7**	**6.7**	**17.3**
Western	8.2	6.3	8.1	1.2
Nyanza	8.0	8.2	7.1	11.3
Rift Valley	8.8	8.6	7.0	20.5
Central	8.6	7.8	6.0	30.2
Nairobi	6.1	5.6	4.6	24.6
Eastern	8.2	8.0	7.0	14.6
Coast	7.2	6.7	5.5	23.6

Sources: See references 4–6.

Contraceptive Use

Increased use of family planning methods may be the major reason for the decline in fertility. KDHS data show that in 1989, 27 percent of currently married women aged 15–49 were using a method of family planning, compared with six percent in 1977–1978 and 14 percent in 1984.‡

As Table 2 shows, current use of all methods rose between 1984 and 1989, and use of modern methods (the pill, the IUD, injectables and sterilization) among currently married women almost doubled (from 10 percent to 18 percent). Over the same period, the proportion using traditional methods (periodic abstinence, withdrawal and folk methods) also doubled, from less than five percent to nine percent. Periodic abstinence continues to be the most widely used method (7.5 percent), followed by the pill (5.2 percent) and female sterilization (4.7 percent), which has supplanted the IUD (3.7 percent).

There were large differentials in levels of contraceptive use by province, ranging from 14 percent of married women in Western and Nyanza provinces to 40 percent of women in Central and Eastern provinces (Table 3, page 6). Provinces closest to Nairobi had the highest levels of use and those farthest away had the lowest levels. However, unlike provincial differentials in fertility, differentials in contraceptive use appear to be narrowing over time. The provinces with the lowest prevalence in 1984 showed the greatest relative increase by 1989; contraceptive prevalence doubled in Rift Valley Province, and in Western Province it almost tripled, while in Central Province it increased by only 16 percent. As a result, a sevenfold differential in use was reduced to a threefold differential.

The provinces differed not only in levels of use, but in the mix of methods used. Traditional methods, including periodic abstinence, accounted for about 25 percent of current use in most provinces, but accounted for more than 50 percent of current use in Eastern Province and nearly 40 percent of current use in Rift Valley (Table 4, page 6). In general, use of modern methods was highest in provinces in which fertility was lowest (Nairobi, Central) and lowest in provinces in which fertility was highest (Western, Nyanza). The provinces that showed the greatest absolute decline in fertility between 1984 and 1989 (Central and Rift Valley) also showed the greatest absolute increase in use of modern methods (from 21 percent to 31 percent and from five percent to 18 percent, respectively). The most commonly used methods, by province, were the pill (Nairobi, Coast and Western), the IUD (Central), female sterilization (Nyanza) and periodic abstinence (Eastern and Rift Valley).

There were also large differentials in contraceptive use among the 13 districts covered (not shown). The data show a ninefold differential in contraceptive use by district, ranging from a high of 52 percent in Kirinyaga District to a low of six

Table 2. Percentage of currently married women aged 15–49 practicing contraception, by method, according to survey, 1984 and 1989

Method	1984 KCPS	1989 KDHS
All methods	**14.3***	**26.9**
Modern methods	**9.7†**	**17.9†**
Pill	3.1	5.2
IUD	3.0	3.7
Injectables	0.5	3.3
Female ster.	2.6	4.7
Other	0.4	0.9
Traditional methods	**4.6**	**9.0**
Periodic abstinence	3.8	7.5
Other	0.8	1.5

*Excludes 2.7 percent using prolonged abstinence, which was not included in KDHS.

†Columns may not add to totals because of rounding.

Sources: **For 1984 KCPS**—see reference 4, Table 7.10. **For 1989 KDHS**—see reference 5.

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*Rates from the 1977–1978 KFS are based on the three-year period before the survey, those from the 1989 KDHS refer to the five-year period before the survey, and both are based on birth histories. Rates for the 1984 KCPS are based on the 12 months preceding the survey and are derived from a question on date of last live birth.

†Calculated by multiplying the age-specific fertility rates by the number of usual female residents listed on the household questionnaire and dividing by the total number of usual household residents.

‡The reported rates of contraceptive use were seven percent in 1977–1978 and 17 percent in 1984; however, these rates included use of prolonged abstinence, which was not asked about in 1989.

Table 3. Percentage of currently married women aged 15–49 practicing contraception, by province, according to survey; and percentage increase, by province, 1984–1989

Province	1984 KCPS	1989 KDHS	% increase
Total	**14.3***	**26.9**	**88.1**
Western	4.6	13.7	197.8
Nyanza	8.6	13.8	60.5
Rift Valley	15.1	29.6	96.0
Central	34.1	39.5	15.8
Nairobi	28.3	33.5	18.4
Eastern	26.3	40.2	52.9
Coast	10.5	18.1	72.4

*Excludes 2.7 percent using prolonged abstinence.

Sources: **For 1984 KCPS**—see reference 4, Table 7.13. **For 1989 KDHS**—see reference 5.

percent in South Nyanza District. Generally, prevalence was highest in districts in the country's central region (Kirinyaga, Nyeri, Machakos, Meru and Murang'a), and lowest in districts in the west (Siaya, Bungoma and South Nyanza) and at the coast (Kilifi). These findings indicate that there are pockets of contraceptive use in Kenya that reach levels as high as those found in more developed countries.

The KDHS data also show variations in contraceptive use according to characteristics of individual women, such as age, education, residence, religion and parity. Contraceptive prevalence was lowest among married women aged 15–19 years (13 percent), and highest among those aged 30–44 years (at least 30 percent were using contraceptives). Educational differentials in contraceptive use were large: Eighteen percent of women with no education, 26 percent of those with some primary education, 30 percent of those with a complete primary education and 40 percent of those with a secondary education were using a method. However, contraceptive use varied little by place of residence: In urban areas, 31 percent of women were using family planning, compared with 26 percent of those in rural areas. The KDHS found some differences by religion in use of family planning, with 29 percent of Protestants, 26 percent of Catholics and 17 percent of Muslims using a method. Protestant women were more likely than Catholic women to use modern methods. Finally, as expected, higher parity women were more likely to use contraceptives than those with one or no child.

Other Factors

Another factor that may have contributed to Kenya's fertility decline is delayed marriage. The proportion of young women who have not married has increased steadily over the past 25 years. In 1962, just over half of women aged 15–19 had not yet married, compared with 80 percent in 1989. Among women aged 20–24, the figures were 13 percent in 1962 and 32 percent in 1989. Data from the KDHS respondents show that age at first marriage has risen over time, from 17.3 among women aged 40–44 to 19.8 among those aged 20–24.

However, the effect of delayed marriage on fertility is unclear. A comparison of KDHS and KFS data show that for most cohorts there has been only a slight increase in median age at first birth; for example, the median age at first birth among women aged 25–29 was 18.3 in 1977–1978, compared with 18.7 in 1989.[7] KDHS data on the median age at first birth show no consistent trend across cohorts. In short, the rather dramatic trend toward delayed marriage has caused only a small delay in the onset of childbearing.

Likewise, the effect of the postpartum variables—breastfeeding, amenorrhea and abstinence—on the fertility decline in Kenya has probably been slight. What little change has occurred in the median duration of these three variables since the 1984 KCPS is downward, which would lead to higher fertility, all other factors being equal. Kenyan women breastfeed their children for an average of 19 months, and therefore experience a relatively long average period of postpartum amenorrhea (11 months). In addition, they report abstaining from sexual relations for an average of six months after birth.

Prospects for the Future

The KDHS results not only show that the transition to lower fertility levels has already begun, but indicate that the decrease may accelerate in the future. Table 5 shows that the mean family size considered ideal by Kenyan women in 1989 was 4.4 children (down from 5.8 in 1984). The mean ideal family size follows the same pattern as fertility levels by province, with high-fertility provinces reporting higher mean ideal family sizes. As Table 5 also shows, half of married women reported that they did not want any more children—a considerably higher proportion than in any other sub-Saharan country in which a DHS has been conducted. Of the other sub-Saharan countries, those with the largest proportion of women wishing to stop childbearing were Botswana and Zimbabwe (33 percent), followed by Togo (25 percent), Burundi (24 percent), Ghana (23 percent), Uganda (19 percent) and Mali and Liberia (17 percent). The proportion of Kenyan women wanting no more children varied widely by province, ranging from 67 percent of women in Central Province to 28 percent in Coast Province. Finally, over half of the births in the 12 months before the survey were reported as being either mistimed or unwanted altogether (42 percent and 11 percent, respectively; not shown).

We constructed estimates of the extent of unmet need for family planning in Kenya from the information on women's desires regarding future childbearing, using a measure that differentiates between need for spacing births and need for limiting the number of children.[8] These estimates, shown in Table 5, suggest that over one-third of married women were in need of family planning, 22 percent for spacing births and 14 percent for limiting births.

Although postponing births has beneficial effects on maternal and child health and mortality, it has only a minor effect on fertility, because the overall number of births may remain the same; however, providing women who want to stop childbearing with the means to do so could have a considerable effect on fertility by averting future births altogether. The

Table 4. Percentage of currently married women practicing contraception, by method, according to province, 1989

Province	Weighted number of women	Total	Traditional methods	Modern methods					
				All	Pill	IUD	Injectables	Female ster.	Other
Total	**4,765**	**26.9**	**9.0**	**17.9**	**5.2**	**3.7**	**3.3**	**4.7**	**0.9**
Western	711	13.7	3.7	10.0	3.8	1.6	1.6	2.6	0.4
Nyanza	872	13.8	3.5	10.2	2.7	0.8	2.5	3.9	0.3
Rift Valley	1,047	29.6	11.5	18.1	3.6	2.3	5.3	5.5	1.5
Central	648	39.5	8.7	30.8	8.1	10.0	3.6	7.7	1.6
Nairobi	335	33.5	5.6	27.9	11.8	7.9	2.3	4.4	1.6
Eastern	804	40.2	20.8	19.5	5.9	4.7	3.5	4.5	0.8
Coast	350	18.1	3.3	14.8	5.5	1.7	3.6	3.6	0.4

Source: See reference 5.

Table 5. Mean ideal number of children among all women aged 15–49; and percentages of currently married women aged 15–49 who want no more children and who have an unmet need for family planning, by province, 1989

Province	Mean ideal number of children	% who want no more children	% with unmet need		
			Total	Spacing need*	Limiting need†
Total	**4.4**	**49.4**	**36.0**	**21.6**	**14.4**
Western	4.9	43.2	46.9	34.0	12.9
Nyanza	4.6	41.7	37.4	23.0	14.4
Rift Valley	4.7	49.7	33.9	20.7	13.2
Central	3.8	67.3	37.4	18.4	19.0
Nairobi	3.6	43.7	31.9	18.9	13.0
Eastern	4.2	59.7	31.9	14.7	17.2
Coast	5.6	28.0	26.3	19.4	6.9

*Calculation of spacing needs is based on nonpregnant, fecund, married nonusers who want to delay their next birth by two or more years, and on pregnant or amenorrheic women whose last birth was mistimed.

†Calculation of limiting needs is based on nonpregnant, fecund, married nonusers who want no more children, and on pregnant or amenorrheic women whose last birth was unwanted.

Source: See reference 5.

KDHS data imply that the already sizable proportion of married women relying on sterilization (4.7 percent) could quadruple if the need for limiting family size were met (14.4 percent). A recent study shows that female sterilization is considered acceptable in many parts of Kenya,[9] so increasing the availability of sterilization services could be important in maintaining the momentum of fertility decline.

The data show that women in Western Province have the greatest need for temporary means of family planning, while those in Central Province are most likely to be receptive to permanent or long-term methods. Coast Province should probably not be targeted for special efforts in family planning, because it has the lowest total unmet need, the highest average ideal family size and one of the lowest levels of fertility; in fact, it is the only province where the average ideal family size is higher than the level of current fertility. These facts suggest that there may be considerable involuntary infertility in Coast Province.

The KDHS provides evidence that the transition to lower fertility has already begun in Kenya. While research is planned to investigate the contribution to this decline of the various determinants of fertility, it seems clear that increased use of family planning methods has been the major reason for the decline. In turn, a recently completed study has shown that a large part of the increase in contraceptive use in Kenya is the result of higher levels of educational attainment among women.[10] Still, despite the increase in contraceptive use, the unmet need for family planning services remains very high. Meeting this need is the challenge that faces program planners and administrators.

References

1. National Council for Population and Development (NCPD), "Population Policy Guidelines," Sessional Paper No. 4, Ministry of Home Affairs and National Heritage, Nairobi, Kenya, 1984, p. 3.

2. Population Council, "Country Profiles: Kenya," New York, 1971, p. 6; and Agency for International Development/Kenya, "USAID Analyses and Strategy for Assistance in Family Planning and Fertility Reduction in Kenya," unpublished manuscript, 1985, p. 21.

3. NCPD, 1984, op. cit. (see reference 1), p. 3.

4. Central Bureau of Statistics (CBS), *First Report, Kenya Contraceptive Prevalence Survey 1984*, Ministry of Planning and National Development, Nairobi, 1984.

5. NCPD and Institute for Resource Development/Macro Systems, Inc., *Demographic and Health Survey 1989*, Nairobi, Kenya, and Columbia, Maryland, 1989.

6. CBS, *First Report, Kenya Fertility Survey 1977–1978*, Ministry of Economic Planning and Development, Nairobi, Kenya, 1980.

7. Ibid.; and NCPD and Institute for Resource Development/Macro Systems, Inc., 1989, op. cit. (see reference 5).

8. C. F. Westoff, "The Potential Demand for Family Planning: A New Measure of Unmet Need and Estimates for Five Latin American Countries," *International Family Planning Perspectives*, **14:**45, 1988.

9. J. T. Bertrand et al., "Attitudes Toward Voluntary Surgical Contraception in Four Districts of Kenya," *Studies in Family Planning*, **20:**281, 1989.

10. W. Njogu, "Trends and Determinants of Contraceptive Use in Kenya," *Demography*, **28:**83, 1991.

Resumen

Los datos de la Encuesta Demográfica y de Salud de Kenya de 1989 demuestran que la tasa de crecimiento demográfico del país, tradicionalmente entre las más altas del mundo, ha comenzado a retardarse. En 1989, la tasa global de fecundidad fue de 6,7 nacidos vivos por mujer, contra 8,1 a mediados de los años 70; gran parte de la baja parece haber ocurrido en los últimos años. La prevalencia de anticonceptivos ha aumentado bruscamente: el 27 por ciento de las casadas utilizan algún método, contra el 14 por ciento en 1984 y el seis por ciento en 1977–1978. La abstinencia periódica sigue siendo el método más utilizado (7,5 por ciento), seguida de la píldora (5,2 por ciento) y la esterilización femenina (4,7 por ciento).

Los resultados de la encuesta indican que la fecundidad probablemente continuará bajando. En 1989 el promedio ideal de hijos era 4,4, contra 5,8 en 1984. La mitad de las kenianas actualmente casadas dicen no querer tener más hijos. Por otra parte, más de la mitad de las mujeres que habían tenido un hijo recientemente no lo habían deseado, o por lo menos no en ese momento. Más de un tercio de las actualmente casadas de entre 15 y 49 años necesitan planificación familiar, el 22 por ciento para espaciar los nacimientos y el 14 por ciento para limitarlos.

Résumé

Les données tirées de l'Enquête Démographique et de Santé effectuée au Kenya en 1989 révèlent que le taux de croissance démographique de ce pays, qui figurait dans le passé parmi les plus élevés au monde, a commencé à ralentir. En 1989, l'indice synthétique de fécondité s'élevait à 6,7 naissances vivantes par femme, soit une baisse par rapport au taux de 8,1 vers le milieu des années 70. Or cette baisse semble s'être produite principalement au cours des quelques dernières années. Le taux d'utilisation de moyens contraceptifs a connu une hausse marquée, 27 pour cent des femmes mariées ayant recours à une méthode au moment de l'enquête par rapport à 14 pour cent en 1984 et six pour cent en 1977–1978. L'abstinence périodique demeure la méthode la plus répandue (7,5 pour cent), suivie de la pilule (5,2 pour cent) et de la stérilisation féminine (4,7 pour cent).

Les résultats de l'enquête suggèrent que le taux de fécondité continuera probablement à baisser. La taille idéale moyenne de la famille était de 4,4 enfants en 1989, une baisse étant ainsi enregistrée par rapport à une moyenne de 5,8 en 1984. La moitié des Kenyennes mariées lors de l'enquête déclarent ne plus vouloir d'enfants. En outre, plus de la moitié des naissances récentes étaient souhaitées pour plus tard ou non désirées. Plus du tiers des femmes âgées de 15 à 49 ans mariées à cette même époque avaient besoin de planning familial, soit pour espacer les naissances (22 pour cent) soit pour arrêter les naissances (14 pour cent).

Estimating Abortion Levels in Brazil, Colombia and Peru, Using Hospital Admissions and Fertility Survey Data

"Our estimates suggest that a high proportion of women in Brazil, Colombia and Peru are seeking induced abortions; and existing statistics show that many thousands of women are suffering adverse health effects from those procedures . . ."

By Susheela Singh and Deirdre Wulf

Summary

Although abortion is illegal in every Latin American country except Cuba, induced abortion is being widely practiced throughout the region. Health planners need reasonable estimates of the prevalence of this practice. A methodology is provided for estimating the numbers of illegal abortions being performed, based primarily on the numbers of abortion complications treated in hospitals. Estimates of the number of induced abortions and the ratio of abortions to births for Peru, Brazil and Colombia indicate that for every 10 women giving birth, 3–4 in Colombia and Brazil and two in Peru terminate their pregnancies.

Introduction

In every Latin American country except Cuba, abortion is illegal, except for the most stringent reasons (rape, incest or fetal abnormality). Despite the legal strictures, induced abortion is widely practiced throughout the region. Estimates of the number of women who illegally terminate unplanned pregnancies every year range into the millions, but the true dimensions of the problem are unknown.

Few sources of data on the subject exist—mainly hospital admission statistics and occasional, small-scale studies of hospitalization and mortality resulting from abortion. These provide only imperfect indicators of abortion prevalence, of the health toll that unsafe induced abortions exact on women, and of the medical and financial burden that the care of these women places on already overstrained hospital systems.[1] Moreover, few national surveys contain questions about this aspect of women's reproductive lives, and even in those that do, underreporting of induced abortion is considered common.

Given the general absence of abortion monitoring at the national level and the flaws in the available data that touch on this phenomenon, researchers must attempt some creative guesswork. In this article, we analyze national hospital statistics from Brazil, Colombia and Peru to estimate levels of induced abortion in these three countries and supplement the Brazilian estimates with data from the Pesquisa Nacional Sobre Saúde Materno Infantil e Planejamento Familiar of 1986, part of the worldwide Demographic and Health Surveys (DHS) project.

The problems associated with the data are myriad. Most hospital statistics do not distinguish between spontaneous and induced abortions, or, because induced abortion is illegal, hospital officials classify all abortions as spontaneous. The completeness of the data and, in the case of hospital samples, the extent to which they are representative of the whole country, may be limited. Moreover, if the distinction between spontaneous and induced abortion is not clear, the researcher must either make an educated guess or treat both types as a single category.

Furthermore, hospital admissions for the treatment of complications are generally thought to be only the tip of the iceberg, because the majority of women who undergo abortions do so safely and never have to be hospitalized. In addition, many women do not answer truthfully when large-scale surveys ask about their abortion experience; they either neglect to tell the interviewer about an abortion or claim that induced abortions were spontaneous miscarriages. (Even in countries where abortion is legal, a large proportion of women fail to report their abortions. In the United States, abortion underreporting in a 1982 national interview survey was calculated as 50 percent, on average, and as high as 80–90 percent among certain groups. Underreporting increased in the 1980s, rising to 65 percent in the 1988 national survey.[2])

Spontaneous Abortion

A reliable estimate of the likely biologic incidence of late spontaneous abortion is necessary to distinguish between patients hospitalized for spontaneous abortions and for induced abortion. Such an estimate is difficult to obtain.

Most spontaneous abortions (defined here as embryonic and fetal miscarriages occurring between the first missed menstrual period and the 27th week of gestation) occur very early in pregnancy, when they would be unlikely to cause complications serious enough to warrant hospitalization. Although spontaneous abortions that occur late in pregnancy (between weeks 17 and 27 of gestation) would probably require hospitalization, the exact proportion that do so is unknown and obviously varies from country to country, depending on the availability and use of modern medical services. In affluent countries like Canada and the United States, the number of spontaneous abortions requiring hospitalization is estimated at about five percent of all live births.[3] The proportion is this high because hospital facilities are generally accessible to most women in these two countries and because some women experiencing spontaneous abortions as early as 8–10 weeks into their pregnancy are also admitted to hospitals, even though they may not stay overnight.

In less developed countries, however, researchers consider it unlikely that many women are hospitalized for the treatment

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of early miscarriage.* They also believe that most hospitalized patients are not receiving treatment for complications of spontaneous abortions, even though women and physicians may report them as such.[4]

One well-documented estimate of the likelihood that a pregnancy will end in a spontaneous abortion has been provided by Susan Harlap and her colleagues.[5] Using life-table analysis, the researchers examined the pregnancy outcomes of 100,000 U.S. women enrolled in the Kaiser Health Plan of Northern California. They calculated that for every 100 pregnancies recognized at four weeks after the last menstrual period, 14.4 ended in spontaneous abortion before 28 weeks. Of these, 9.5 did so between weeks five and 11; 2.8 between weeks 12 and 16; and 2.1 between weeks 17 and 27.

The number of late spontaneous abortions—those occurring between 17 and 27 weeks—can be translated into a percentage of all the remaining pregnancies that ended in a live birth. (Live births are calculated by excluding all recognized spontaneous abortions and the estimated 0.8 percent of pregnancies that result in fetal death after 27 weeks of gestation.) This calculation yields an estimate of late spontaneous abortions equal to 2.48 percent of all live births. In this article, therefore, we distinguish between spontaneous and induced abortions by assuming that the number of hospitalized late spontaneous abortions in a given country would, typically, be the equivalent of 2.48 percent of all births occurring in that country each year.

Some question remains about whether the incidence of late spontaneous abortion is relatively constant among all women or whether it is strongly influenced by general social and health conditions in a given society. The study by Harlap and colleagues was conducted in the United States in the late 1970s, after abortion was legalized. Legalization of abortion certainly reduces the absolute number of late spontaneous abortions, and any increase in the availability of abortion services may cause a small reduction in the incidence of late spontaneous abortion, by allowing some women who would otherwise be at high risk of spontaneous abortion to elect pregnancy termination. An opposing trend to the reduction in incidence is the increasing number of women with high-risk pregnancies who, using the improved medical technology now available, attempt to carry a pregnancy to term; some do not succeed and experience a late spontaneous abortion instead.

However, the availability of legal abortion should not affect the ratio of late spontaneous pregnancy loss to live births, except in the unlikely situation that women who have induced abortions have a significantly different risk of late spontaneous abortion than do women whose pregnancies are carried to term. Moreover, studies carried out in the 1960s, before abortion was legalized in the United States and before recent improvements in obstetric and neonatal technology and the new emphasis on the need for comprehensive prenatal care for all women,[6] arrived at estimates of the ratio of midtrimester and later spontaneous abortions to the number of live births very similar to those found later by Harlap and colleagues. Therefore, we believe that their ratios are sufficiently robust to be applicable to women in the Latin American countries included in this analysis.

Illegal Abortion Estimates

Besides deciding on an acceptable ratio between spontaneous abortions and all live births, the researcher must also hazard an estimate as to what the visible tip of hospitalizations for abortion complications suggests about the size of the submerged iceberg—that is, the volume of all abortion procedures being carried out. Such guesswork requires a good understanding of the illegal abortion system that exists in a given country. Who performs most illegal abortions—trained doctors and midwives or untrained birth attendants? What are the financial costs? What percentage of women are likely to be able to afford those costs? Where are induced abortions performed? What techniques are commonly used? Are services concentrated in urban areas or in particular parts of the country? At what stage of pregnancy are most induced abortions performed? Does the abortion method used change with months of gestation?

The answers to these questions can assist the researcher in assessing the general safety of illegal abortion in a given country, an assessment that is necessary in estimating the numerical relationship between abortion complications leading to hospitalization and all abortions occurring within a given country. The major assumption underlying the use of hospital admission statistics to calculate abortion levels is that in countries or areas where abortion is performed by trained professionals under safe conditions, the complication rate is lower than the rate in countries or localities where women must resort to untrained practitioners using insanitary techniques, or where a high proportion of abortions are self-induced. In countries with safe services, it is assumed that few women will suffer complications, so hospitalized women will represent only a small proportion of all women undergoing abortion. On the other hand, in countries where abortions are performed under less favorable conditions, the complication rate will be much higher, and hospitalized women will represent a considerably greater proportion of the total who undergo the procedure.

Thus, an understanding of the way illegal abortions are provided, in combination with data on hospitalization for the treatment of complications, enables us to draw some conclusions about the overall abortion picture in countries where no statistics are maintained and where the true prevalence of the phenomenon is unknown.

Most research carried out in Latin America assumes that between one of every three and one of every five induced abortions being performed results in hospitalization. For example, an estimated 20 percent of all abortions in Brazil require hospitalization for the treatment of complications, according to the former minister of health from the State of São Paulo, although he pointed out that the true proportion is unknown and could vary widely.[7] However, another experienced researcher in the field believes 20 percent is too high for Brazil (and probably Colombia) and that a more reliable estimate would be that one of every seven induced abortions requires hospitalization for the treatment of complications.[8] This lower ratio of hospitalizations is presumably because most large Colombian and Brazilian cities have clinics where safe abortions are performed with modern, aseptic techniques. In contrast, studies carried out in Chile in the mid-1960s indicated that one-

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*The measure of hospitalized spontaneous abortions as a percentage of all live births is likely to be highly variable from one society to another because it is influenced by such factors as the availability and accessibility of hospital care and women's propensity to resort to hospital care, not only for serious medical problems but as a precaution in less serious cases. In developing countries such as Brazil, Colombia and Peru, not all women in need of obstetrical care are hospitalized. In fact, about one-half of Peruvian women giving birth, one-third of Colombian women and one-fifth of Brazilian women do not deliver in hospitals. There is little reason to believe that women in these countries who experience a spontaneous abortion will be any more likely to attend a hospital than those who give birth. Some cases of complications from induced abortion may be treated on an outpatient basis, or in private doctors' clinics or offices. For all these reasons, the rate imputed from the hospital statistics of one country is not necessarily generalizable to another country.

Table 1. An estimation of the number of induced abortions and the ratio of abortions to births in Peru, Brazil and Colombia, by year and source of data

Country, year and source of data	No. of hospitalizations attributed to abortions	No. of births	No. of hospitalizations attributed to spontaneous abortions (2) x 2.48%	No. of hospitalizations attributed to induced abortions (1) - (3)	No. of induced abortions			Induced abortion ratios*		
					Low (4) x 3	Moderate (4) x 5	High (4) x 7	Low (5)/(2)	Moderate (6)/(2)	High (7)/(2)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Peru, 1977										
Hospital survey	37,148	618,000	15,326	21,822	65,466	109,110	na	106	177	na
Peru, 1981										
National statistics	57,800	660,800	16,388	41,412	124,236	207,060	na	188	313	na
Brazil, 1980										
INAMPS (unadjusted)	201,597	3,800,000	94,240	107,357	322,071	536,785	751,499	85	141	198
INAMPS (adjusted†)	288,000	3,800,000	94,240	193,760	581,280	968,800	1,356,320	153	255	357
Brazil, 1985										
DHS (unadjusted)	285,000	4,007,000	99,374	185,626	556,878	928,130	1,299,385	139	232	324
DHS (adjusted‡)	379,000	4,007,000	99,374	279,626	838,878	1,398,130	1,957,385	209	349	488
DHS (adjusted§)	570,000	4,007,000	99,374	470,626	1,411,878	2,353,130	3,294,385	352	587	822
Colombia, 1985										
National statistics	71,375	855,000	21,204	50,171	150,513	250,855	351,197	176	293	411

na=not applicable. *The number of induced abortions per 1,000 live births. †Assuming that INAMPS receives 70 percent of all cases. ‡Assuming 25 percent underreporting of hospitalized abortion cases. §Assuming 50 percent underreporting of hospitalized abortion cases.

third of induced abortions had complications requiring hospitalization,[9] suggesting that many women undergoing abortions in Chile at that time experienced unsafe procedures.

The 1986 Brazil DHS included a few questions on abortion, but these were designed specifically to measure morbidity and levels of hospitalization, not to yield estimates of abortion levels in that country. The findings provide an estimate of the percentage of all women who were hospitalized for complications in the year before the survey, and this estimate can be used to make an indirect estimate of the total number of abortions occurring in that year. In addition, women were asked if they had had an abortion in the previous year, and whether it had been induced or spontaneous; their responses can be used to calculate a direct estimate of the level of abortion.

A second important contribution of the Brazil DHS is the data's ability to provide a national picture of the characteristics of women having abortions. However, this picture is accurate only if women in all demographic subgroups underreport or misreport their abortion experience to the same degree, and this is not always the case. U.S. data for 1988 show, for example, that married women and white women are more likely to report their experience accurately than are single women and nonwhite women.[10]

Although they require many assumptions, hospital and survey data remain almost the only available means of estimating the prevalence and patterns of abortion in countries where the phenomenon goes largely unreported and unmeasured. We use hospital data from Peru, Brazil and Colombia to estimate overall levels of abortion in these countries and to compare the hospital data estimates from Brazil with ones made on the basis of the 1986 DHS data.

Hospital Admissions in Peru

Little is known about the conditions under which illegal abortions are performed in Peru. Although a few clandestine clinics and private medical services that perform abortions are widely assumed to exist in Lima and other cities, the cost of these services is probably beyond the reach of most women. The majority of women in Lima, and in other parts of the country, must resort to abortion services that may be less expensive but are provided by untrained practitioners and performed in an unsafe environment. Because abortion services are poorly developed, health complications and death probably accompany a larger percentage of illegal abortions in Peru than in Colombia and Brazil, where most major cities have widespread systems of professionally staffed clinics providing relatively low-cost services.

In 1977, Peru's Ministry of Health carried out a detailed study of abortion complications treated at government and private hospitals.[11] The sample of hospitals surveyed was selected to represent one-quarter of the hospital beds in the country (7,000 out of a total of 29,000). The investigators found that 9,287 patients with abortion complications had been treated in these hospitals in a one-year period. If this number is multiplied by four, on the assumption that the unsurveyed hospitals admitted similar levels of patients with abortion complications as the hospitals covered by the study, the result would be 37,148 abortions with complications serious enough to require hospital treatment (see Table 1). Assuming that spontaneous abortions requiring hospitalization totaled 15,326 (2.48 percent of births in 1977), the remaining 21,822 of these 37,148 cases would be for the treatment of induced abortions.

But how many other women in 1977 underwent induced abortions that were performed safely enough not to cause dangerous health complications? If we assume initially that a relatively high proportion of abortions were performed under insanitary conditions and that one in three resulted in complications (that is, for every abortion complication case admitted, two other abortions were performed safely), we arrive at a relatively low estimate of 65,466 induced abortions among the total population in 1977.

Given that 618,000 births occurred in Peru in the same year,* there would be 106 abortions per 1,000 live births. Alternatively, if one assumes that abortions were being performed much more safely and that only one-in-five illegal abortions caused serious complications, an estimated 109,110 abortions were performed in 1977, for a ratio of 177 abortions per 1,000 live births. Because it is not plausible to assume that illegal abortions in Peru were being performed as safely as in the other two countries under analysis, the seven-to-one ratio is not applied in the case of Peru.

A similar analysis can be done for a more recent year. As part of a broad study of health care services in Peru, the investigators found that public sector hospitals treated 32,628 patients for abortion complications in 1981.[12] Their study covered 90 percent of Ministry of Health hospitals (60 percent of all hospital beds in the country) and included only a few of the country's remaining private and social security hospitals, so the sample is not representative of the entire country. The 1977 Peruvian Ministry of Health Study revealed that 37.3 percent of all abortions were performed in these other hospitals, both in the public sector (among them social security and armed forces facilities) and in the private sector).[13] For the year 1981, for example, we can inflate the number 32,628 to allow for the 10 percent of Ministry of Health hospitals that were not surveyed and for the 37.3 percent of other hospitals omitted from the sample, and we arrive at a final estimate of 57,800 patients treated for abortion complications in that year.

Subtracting spontaneous abortion cases calculated in the same way as previously shown gives us an estimated 41,412 patients hospitalized for the treatment of complications from induced abortion. Again, introducing an adjustment factor to allow for abortions not requiring hospitalization, we arrive at a total of either 124,236 (two safe induced abortions for every one unsafe procedure) or 207,060 (four for every one) induced abortions performed in Peru in 1981. If these numbers are compared with the number of live births occurring in Peru (obtained by applying the crude birth rate of 37.22 births per 1,000 population for 1981), ratios of 188 or 313 abortions per 1,000 live births are the result. Comparison of the Peru findings for 1977 and 1981 (a comparison that is plausible because of the similarity of the data sources for both years) suggests that there was an increase in the prevalence of induced abortion during that period.

Hospital Admissions in Brazil

At the national level, there are two sources of information about hospitalizations resulting from abortion in Brazil. A special study carried out in 1982 collated service statistics from the Instituto Nacional da Assistência Médica e Previdência Social (INAMPS) system of hospitals and obtained a count of 201,597 admissions for abortion complications in 1980 (see Table 1).[14] The INAMPS system reportedly covers about 70 percent of Brazil's total population.† The data as reported do not allow admissions for complications resulting from spontaneous abortions and those resulting from induced abortions to be separated. Nevertheless, under the same assumptions as for Peru, we can use these data to make estimates of all induced abortions in Brazil in 1980.

Some Brazilian researchers suggest that most women suffering complications from induced abortion would seek care through the INAMPS system because it is free and because private facilities and physicians are reluctant to assume responsibility for the legal problems that can result from such cases. However, reports obtained from the 1986 DHS about the source of care show that 30 percent of women who were hospitalized for abortion complications sought private care. Assuming that these reports are correct, the total number of hospitalized patients would therefore have to be adjusted to 288,000 (201,597/0.7).

Applying the factor of 2.48 percent to the number of live births in Brazil in 1980 yields an estimate of 94,240 patients hospitalized for spontaneous abortion; this leaves the number of patients hospitalized for induced abortion at 107,357 (unadjusted for the incompleteness of the sample) or 193,760 (adjusted). Assuming that either two, four or six more induced abortions are performed for every one that requires hospitalization, we reach the estimate that 322,071, 536,785 or 751,499 illegal abortions were performed in Brazil in 1980, without correction for the fact that INAMPS does not cover the total population. These numbers yield unadjusted ratios of 85, 141 or 198 abortions per 1,000 live births. After adjustment, the ratios would be 153, 255 or 357 induced abortions per 1,000 live births for Brazil in 1980.

Survey Data for Brazil

A second estimate of the overall number of Brazilian women being hospitalized for the treatment of induced abortion complications can be made using data from the 1986 DHS.[15] Women in the survey were asked whether they had ever had an abortion, whether they had had one in the previous year, whether there had been medical complications and whether they had been hospitalized for the treatment of those complications. Women who had an abortion that resulted in complications or even hospitalization are probably more likely to report it than women who had an uncomplicated procedure, because complications will make the event more memorable and hospitalization is likely to make it more socially acceptable to report the experience. The reporting of complications and hospitalization for their treatment is, therefore, probably more reliable than the overall reporting of abortion but these events are likely to be considerably underreported, too.

About two percent of women reported having had an abortion during the previous year; 1.7 percent of the abortions were reported as spontaneous, and 0.4‡ percent as induced. Less than half of these women (43 percent or 0.9§ percent of all women aged 15–44) said that they had been hospitalized for complications in the previous year. This is the equivalent of 285,000 Brazilian women. Underreporting of abortions is obviously high; for example, only 35 percent of abortions performed in the

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*For Brazil and Colombia, as well as for Peru, estimates of the annual number of live births for all the relevant years are taken from: Centro Latino Americano de Demografía, "América Latina: Proyecciones de Población, 1950–2025," *Boletín Demográfico*, No. 40, July 1987.

†However, INAMPS is reported in the DHS as the source of payment for only 49 percent of all deliveries. A further 21 percent of births were reportedly delivered "free." If these births in fact occurred within the INAMPS system without the women in question realizing that they did, the total INAMPS coverage would indeed be about 70 percent of the country's population.

‡If this percentage (0.00356) were applied to all women aged 15–44 in Brazil, the number of induced abortions reported in 1985 would be 112,700. Assuming that women in Brazil (where abortion is illegal) are as likely as those in the United States (where it is legal) to report to a survey interviewer that they had had an induced abortion, underreporting would be about 50 percent, so the reported number would have to be doubled—to 225,400 induced abortions—resulting in a ratio of 169 abortions per 1,000 live births.

§Only 0.1 percent of all women in the DHS reported having been hospitalized for the treatment of complications resulting from an induced abortion. A further 0.8 percent said they had been hospitalized for complications from a spontaneous abortion. These percentages seem unlikely, given other international estimates of the incidence of hospitalization for the treatment of spontaneous abortion complications. For this reason, we reject these reports and, instead, assume that the number of hospitalizations for the treatment of spontaneous abortions is equivalent to 2.48 percent of all live births.

United States were reported in the 1988 national fertility survey carried out by personal interviews.[16] If we assume, as Table 1 shows, that 75 percent of hospitalizations were reported by respondents in the Brazilian survey, then an estimated 379,000 women were hospitalized for the treatment of abortion complications in 1985; if we assume 50 percent, then 570,000 women were hospitalized.

There were an estimated four million births in Brazil in 1985, which means that about 99,374 women (4,007,000 x 0.0248) could have had spontaneous abortions requiring hospitalization. If this number is subtracted from the number of hospitalized abortion patients, and we then assume the moderate ratio of four safe abortions to each hospitalized case, the resulting estimates of the total number of induced abortions performed in Brazil would be 928,130, 1,398,130 or 2,353,130, depending on whether there is complete reporting, 25 percent underreporting or 50 percent underreporting. These estimates in turn lead to ratios of 232, 349 or 587 abortions per 1,000 live births in Brazil in 1985. The high-estimate ratios (assuming six safe abortions for every one resulting in complications) would range from 324 to 822 abortions per 1,000 live births in 1985. Although the ranges of the 1980 and 1985 estimates overlap slightly, the 1985 range is considerably higher. Because the levels of hospitalization due to abortion reported in 1985 were so low, the estimates are likely to suffer from large sampling errors. Therefore, it would be premature to conclude from this evidence that there was an increase in induced abortion in Brazil between 1980 and 1985. However, both sets of estimates point strongly to a fairly high level of abortion in Brazil.

Hospital Admissions in Colombia

In Colombia, the Ministry of Health collects statistics on hospital admissions by type of diagnosis. These data show that in 1985, 62,096 women were admitted to hospitals for the treatment of abortion complications.[17] Since hospital discharge data reported to the Ministry of Health are estimated to represent 87 percent of all hospitalizations,[18] there were probably 71,375 women admitted for abortion complications, of which 21,204 (855,000 live births x 0.0248) are likely to have been for spontaneous abortions. This leaves an estimated 50,171 patients who were treated for induced abortions. Because abortion clinics in Colombia are widely available, we believe a realistic assumption would be that four or six abortions without complications are performed for every one that results in the need for treatment, totaling 250,855 or 351,171 induced abortions. This would lead to abortion ratios of 293 or 411 abortions per 1,000 live births in Colombia in 1985.

Discussion

None of the uncertainties associated with the data that we have used to make these estimates of induced abortion are new. Abortion researchers have long recognized the problems inherent in both hospital admission statistics and data derived from national surveys of women. However, information about the prevalence of abortion in Latin America is likely to remain incomplete, and sometimes misleading, as long as abortion remains in a socially "gray" area of coexisting attitudes of tolerance and secrecy about the procedure.

On the books, abortion is illegal and punishable by law, but, prosecutions are few. In some large cities in Latin America where a network of abortion clinics known to most members of the medical profession has developed, the police may turn a blind eye to their operation, just as they do in other areas to the thousands of women treated in municipal hospitals for septic or incomplete abortions. Nevertheless, the fear of prosecution inhibits many doctors and hospitals from performing abortions, and few doctors or hospital administrators are prepared to risk publishing their service statistics accurately.

On the other hand, most health professionals in the region are aware of the health problems for women and of the strain on scarce health resources (hospital beds, antibiotics, blood supplies, nursing and medical care) imposed by the large numbers of women prepared to subject themselves to the dangers of unsafe induced abortions rather than carry an unplanned pregnancy to term. All the investigator can do in such a situation is take into account, and correct for, the deficiencies of the data by making assumptions about whatever aspects are not known or not clear. But because the resulting estimates depend on such assumptions, they will necessarily have broad margins of error and must be accepted with considerable reservation.

Despite these limitations, the estimates that we have attempted here have some merit. Since the true ratio of hospitalized abortions to all abortions, and therefore of abortions to live births, is difficult to estimate and varies with the conditions existing in each country, we have provided a wide range of estimates based on three differing assumptions about what part of the hidden iceberg is represented by women experiencing complications and receiving treatment in hospitals. Overall, these estimates support the belief that conditions that have long been suspected or claimed in Latin America do exist—that even though abortion is illegal throughout most of the region, it is widely practiced. By the 1980s, for every 10 women giving birth, the number terminating their pregnancies by induced abortion equaled 3–4 in both Colombia and Brazil (using a moderate-to-high ratio between all abortions and those hospitalized for the treatment of complications) and almost two in Peru (using our preferred low ratio in this country).

In the two countries with data available for more than one year, the reliability of the findings as a basis for charting trends in induced abortion differs somewhat. In Peru, because the estimates are based on the same type of data source and because measurement errors are relatively small, we are confident that the increase indicated by the findings did in fact occur. Moreover, there is other evidence to support this conclusion. Contraceptive prevalence is still low in Peru, the government program to distribute contraceptive services is highly uneven, and there is a considerable reliance on methods that have high failure rates.[19] However, fertility has declined substantially in the past 20 years.[20] In their report of an experimental study carried out as a part of the 1986 Peruvian Demographic and Health Survey, the investigators found it "quite possible that abortions account for a substantial part of the estimated decline" in fertility in Peru between 1980 and 1986, since "estimates of the proximate determinants . . . indicate almost no change in the proportions of women married, in the prevalence and efficacy of contraceptive use and in the extent of lactational amenorrhea."[21]

The finding of a possible increase in abortion suggested by the trend data for Brazil is more questionable. The source of data used in each year is different: The 1980 data come from national health statistics, while the 1986 source is a sample survey of women aged 15–44. The survey estimate is likely to be subject to large sample error, which results in a range of estimated abortion ratios for 1986 that overlaps the estimates for 1980. It is difficult, therefore, to conclude that an increase occurred, especially since the estimates show that levels of induced abortion were already high by 1980.

Analysis of the characteristics of Brazilian women who report that they have had an abortion (not shown here) confirms much previous research from Latin America: Abortion is most widely practiced among urban women, women in their late 20s or early 30s, married women and those with three or more children.[22] Since urban women now make up a majority of the female population in most Latin American countries and since clandestine (though often tacitly acknowledged) abortion clinics are most likely to be found in cities, large numbers of Brazilian women may now be able to obtain safe induced abortions performed by trained doctors using aseptic techniques. This development is one of the main reasons why we opted to use a one-to-five or one-to-seven ratio in describing the numerical relationship between patients hospitalized for treatment of complications and all abortions in Brazil.

However, contraceptive prevalence is high in Brazil, especially in urban areas, and most women practicing a reversible method use the pill,[23] which, in theory, has low failure rates. Yet women may be using this method incorrectly and very few other reversible methods are available in Brazil. In addition, social change in Brazil is occurring at an accelerated pace, bringing about rapid changes in sexual and reproductive behavior (more consensual unions, more liberal attitudes toward premarital and extramarital relationships) and in the roles of women, especially their increased participation in the labor force.[24] All these changes are likely to contribute to changes in the definition of unplanned pregnancy.

Finally, there is speculation that in countries where fertility regulation and birthspacing become attainable through the use of contraceptives, unplanned pregnancies occurring as a result of contraceptive failure become less acceptable and are more, rather than less, likely to be terminated by abortion. This seems to be the case in the United States, where family planning services are generally available and most modern methods are offered, yet both contraceptive prevalence and abortion rates are high.

Whatever the background conditions, our estimates suggest that a high proportion of women in Brazil, Colombia and Peru are seeking induced abortions; and existing statistics show that many thousands of women are suffering adverse health effects from those procedures, the treatment of which is bound to absorb scarce medical resources. Furthermore, women who suffer complications from induced abortion can be exposed to more serious problems, such as infertility; some may die. Yet the true level of induced abortion is unknown, and neither of these adverse outcomes can be measured with any accuracy. Because of the grave public health, economic and personal consequences of illegal abortion, researchers must practice statistical inventiveness in attempting to measure the true prevalence of this practice worldwide.

References

1. G. López-Escobar, G. Riaño-Gamboa and N. Lenis-Nicholls, *Aborto*, Corporación Centro Regional de Población, Bogotá, 1978; International Fertility Research Program, *Abortion in Latin America*, Research Triangle Park, N.C., 1980; P. I. Gomez and J. C. Pulido, "Mortalidad Materna en el Hospital Materno-Infantil, 1985–1986," unpublished mimeo, Facultad de Medicina, Universidad Nacional de Colombia, Bogotá, Feb. 1988; P. E. Bailey, et al., "Estudio Hospitalario del Aborto Ilegal en Bolivia," *Bulletin of the Pan American Health Organization*, **104**:144, 1988; E. Becerra, "Mortalidad Materna en el Instituto Materno-Infantil de Bogotá, Años: 1981–1982," *Revista Colombiana de Obstetricia y Ginecología*, **71**:328, 1986; L. A. Gómez et al., "El Aborto Inducido Ilegalmente en el Hospital de la Mujer, Berta Calderón, Managua: Costos y Consecuencias," unpublished mimeo, Managua, 1985; and K. D. Laguardia, "A 10–Year Review of Maternal Mortality in a Municipal Hospital in Rio de Janeiro: A Cause for Concern," *Obstetrics & Gynecology*, **75**:28, 1990.

2. E. F. Jones and J. D. Forrest, "Contraceptive Failure in the United States: Revised Estimates from the National Survey of Family Growth," *Family Planning Perspectives*, **21**:103, 1989, Table 1; and E. F. Jones and J. D. Forrest, "Underreporting of Abortion in Surveys of U.S. Women: 1976 to 1983," paper presented at the annual meeting of the American Public Health Association, New York, Oct. 1–4, 1990.

3. A. Narod and R. Khazen, "Spontaneous Abortions in Ontario, 1979–1984," *Canadian Journal of Public Health*, **80**:209, 1989; and L. Lawrence, "Detailed Diagnoses and Procedures for Patients Discharged from Short-Stay Hospitals, United States 1984," *Vital and Health Statistics*, Series 13, No. 86, 1986.

4. Ministerio de Salud, Dirección General de Salud Materno-Infantil y Población, *El Aborto en los Establecimientos de Salud de Perú*, Lima, 1980; and H. Pereira de Melo, "Sequelas do Aborto," unpublished thesis, Rio de Janeiro, May 1982.

5. S. Harlap, P. H. Shiono and S. Ramcharan, "A Life Table of Spontaneous Abortions and the Effects of Age, Parity and Other Variables, in E. B. Hook and I. Porter, eds., *Human Embryonic and Fetal Death*, Academic Press, New York, 1980, Table 1, pp. 148 & 157.

6. W. F. Taylor, "On the Methodology of Measuring the Probability of Fetal Death in a Prospective Study," *Human Biology*, **36**:86, 1964; F. E. French and J. M. Bierman, "Probabilities of Fetal Mortality," *Public Health Reports*, **77**:835, 1962; S. Shapiro, H. S. Levine and M. Abramowicz, "Factors Associated with Early and Late Fetal Loss," in *Advances in Planned Parenthood*, Excerpta Medica, New York, **6**:45, 1971; and L. S. Bakketeig, D. G. Seigel and P. M. Sternthal, "A Fetal Infant Life Table Based on Single Births in Norway, 1967–1973," *American Journal of Epidemiology*, **107**:216, 1978.

7. J. A. Pinotti, "Medical Perspective on the Causes and Consequences of Unwanted Pregnancy," paper presented at the Christopher Tietze Meeting on Unplanned Pregnancy, Rio de Janeiro, October 27–31, 1988; and J. A. Pinotti and A. Faúndes, "Unwanted Pregnancy: Challenges for Health Policy," *International Journal of Gynecology and Obstetrics*, Supplement 3, 1989, p. 97.

8. T. Frejka, The Population Council, Mexico City, personal communication, May 3, 1990.

9. L. S. Liskin, "Complications of Abortion in Developing Countries," *Population Reports*, Series F, No. 7, 1980, p. 144–149; T. Frejka and L. C. Atkin,"The Role of Induced Abortion in the Fertility Transition of Latin America," paper presented at the Seminar on the Fertility Transition in Latin America, International Union for the Scientific Study of Population, Buenos Aires, Apr. 3–6, 1990; R. Armijo and T. Monreal, "The Problem of Induced Abortion in Chile," *Milbank Memorial Fund Quarterly*, **43**:263, 1965; and T. Monreal, "Determinant Factors Affecting Illegal Abortion Trends in Chile," in H. R. Holtrop et al., eds., *New Developments in Fertility Regulation*, The Pathfinder Fund, Chestnut Hill, Mass., 1976, pp. 123–132.

10. E. F. Jones and J. D. Forrest, 1990, op. cit. (see reference 2).

11. Ministerio de Salud, 1980, op. cit. (see reference 4).

12. D. Gonzales del Carpio et al., Análisis del Sector Salud Project, *Perfil de Salud de la Población Peruana*, Informe Técnico, No. 1, Lima, May 1986.

13. Ministerio de Salud, 1980, op. cit. (see reference 4).

14. H. Pereira de Melo, 1982, op. cit. (see reference 4).

15. *Pesquisa Nacional Sobre Saúde Materno-Infantil e Planejamento Familiar, Brasil—1986*, Sociedade Civil Bem-Estar Familiar no Brasil and Instituto para Desenvolvimento de Recursos, Rio de Janeiro, Dec. 1987.

16. E. F. Jones and J. F. Forrest, 1990, op. cit. (see reference 2).

17. Unpublished table of data from the Colombian Ministry of Health: "Diagnósticos de hospitalización según 183 causas de la lista nacional, por sexo y grupos de edad para el total nacional: Colombia 1985."

18. E. Prada, Bogotá, Colombia, personal communication, Apr. 6, 1988.

19. Instituto Nacional de Estadistica, *Encuesta Demográfica y de Salud Familiar, 1986: Informe General*, Lima, 1988, Table 5.6, p. 62.

20. Ibid., Table 3.3, p. 32.

21. N. Goldman, L. Moreno and C. F. Westoff, *Peru Experimental Study: An Evaluation of Fertility and Child Health Information*, Office of Population Research, Princeton University, Princeton, N.J., and Institute for Resource Development/Macro Systems, Columbia, Md., Oct. 1989.

22. Special tabulations of the data tape of the 1986 DHS.

23. *Pesquisa Nacional Sobre Saúde Materno-Infantil e Planejamento Familiar*, 1987, op. cit. (see reference 15); and S. H. Costa et al., "Family Planning Among Low-Income Women in Rio de Janeiro: 1984–1985," *International Family Planning Perspectives*, **16**:16, 1990.

24. M. H. Henriques et al., *Adolescentes de Hoje, Pais do Amanhã: Brasil*, Alan Guttmacher Institute, New York, 1989.

Resumen

Si bien el aborto es ilegal en todos los países de América Latina excepto Cuba, el aborto inducido se practica muchísimo en toda la región. Los planificadores de la salud necesitan estima-

(Continued on page 24)

Effect of Family Planning Program Components On Contraceptive Acceptance in Four Indian States

In India, the family planning program is implemented largely by state governments, and a state's organizational efficiency and socioeconomic milieu determine to a large extent the structure and effectiveness of any family planning input.

By K. Srinivasan, P. C. Saxena, T. K. Roy and R. K. Verma

Summary

Data collected during the mid-1980s from 2,175 primary health centers (PHCs) in rural areas of four Indian states reveal that the presence and effects of various components of the family planning program differ widely by state. In Maharashtra, for example, PHCs had an average of 6.5 physicians per 100,000 population, while in Tamil Nadu, there were fewer than three doctors per 100,000; Maharashtra had 34 paramedics per 100,000 population, while in West Bengal, Tamil Nadu and Karnataka, there were only 24–28 paramedics per 100,000. However, within states, most of these measures vary little by the socioeconomic conditions of the districts in which the PHCs are located. Acceptance levels of sterilization and of the IUD are often no higher in well-staffed and well-equipped PHCs than in those that are poorly staffed and equipped. Furthermore, a number of PHCs show little coordination in the types of services available (such as having an operating theater but no trained doctor capable of using it). The ability of the attributes studied to explain the variance in rates of sterilization and IUD acceptance in these four states came to no more than about 50 percent, and often a good deal less, indicating that other factors (probably political support and managerial efficiency) play a greater role in program success.

Background

India launched an official family planning program in 1952 as part of its First Five-Year Plan, and over the past 38 years, the program has been expanded considerably through the extension of a network of maternal and child health services and medical facilities in rural and urban areas. Almost every village and urban area of the country has now been provided with family planning education, supplies and services through primary health centers (PHCs) and urban welfare centers.

As of March 1988, a sum of Rs.50 billion (about U.S. $3 billion) had been expended since the program's inception. Nevertheless, despite the intensity of the national efforts, the program's achievements have been disappointing. The couple protection rate* (CPR) had increased to only 40 percent of eligible couples as of March 1988, and fertility had declined less than expected in every Five-Year Plan. Since 1977, the crude birthrate has stagnated at around 33 births per 1,000 population per year. Many countries in Asia that launched family planning programs much later than India—such as Korea, Indonesia and Thailand—have achieved higher CPRs and larger fertility declines. Efforts to improve the effectiveness and efficiency of the Indian family planning program are urgently needed.

One problem is that enormous interstate and interdistrict variations exist in the CPR and in fertility; for example, in 1988, there were areas in almost every state with a CPR as high as 60 percent—a level targeted for the country as a whole by the turn of the century—and at the same time districts with a CPR of less than 15 percent.[1] Similarly, there were districts with a total fertility rate (TFR) of close to 2.5 lifetime births per woman and districts with a TFR of more than five births per woman.

The basic administrative units for delivering family planning services in rural areas are the PHCs. Following a nationally set pattern, personnel and facilities are supposed to be deployed uniformly at the PHC level within each state, although there is some variation between states.† Why, then, should there be such a high degree of variation in family planning acceptance among the districts and PHCs within a state?

First, despite the government's intentions, the provision of facilities and personnel are not actually uniform in all PHCs.[2] Medical and paramedical positions in a PHC may often be vacant for long periods of time, and the supply of essential materials may be inadequate. However, it is not clear if variations in the availability of personnel and materials are wholly responsible for differentials in program performance at the PHC level. Little is known about the relationship between program input and performance; the findings of research on the topic could help decision-makers deploy additional resources or manage existing resources better to achieve an optimal acceptance rate.

Second, variation in program performance at the PHC level may also be affected by the overall socioeconomic development of the region. In more developed areas, people may demand health and family welfare services of their own volition. If the availability of any given component is drastically influenced by the population's social, economic and cultural

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*The percentage of fertile couples using some method of family planning.

†PHCs provide curative, preventive and promotive health services to people in rural areas of India. They were originally intended to serve populations of 80,000–100,000; however, since 1978, the Indian government has moved to strengthen the rural health infrastructure by establishing one PHC for every 30,000 population (or one per 20,000 in hilly, tribal or backward areas). However, progress in achieving this goal has been uneven. Maharashtra has been fairly successful in establishing PHCs at a rate of one per 30,000, but Tamil Nadu and West Bengal persist in having PHCs cover populations of nearly 100,000, while the situation in Karnataka is somewhere between these.

conditions, program strategy may require reorganization.

Family planning program components are also believed to contribute substantially to increased contraceptive practice and therefore to reduced fertility. One study of the influence of family planning program effort on CPRs and fertility in 93 developing countries between 1965 and 1980 concluded that program effort had an independent and significant impact on fertility.[3] Another investigator presented a demographic approach for estimating the indigenous effect and the net program effect, country-wide, for four developing countries—Costa Rica, Mauritius, South Korea and Taiwan.[4] Thus, identifying all program components that affect family planning performance may provide useful guidelines for improving program strategies in India.

Some evaluations of the efficacy of the Indian family planning program have already been conducted. B. D. Mishra and colleagues observed that the functioning of the Indian family planning program was greatly influenced not only by the nature of the bureaucracy of the central and state health ministries but also by the political climate and by the socioeconomic and cultural conditions of the state.[5] After an analysis of program activities in the Indian states of Goa, Maharashtra and Tamil Nadu, T. V. Antony and associates concluded that the three major determinants of success in family planning performance were political support, program efficiency and socioeconomic environment; for success, at least one of these factors needed be highly conducive to and supportive of family planning activities.[6]

In recent years, there has been much discussion in the family planning field about strategic management and quality of care, with strategic management thought to consist of environment, strategy and process, and quality of care thought to be reflected in the method mix and in follow-up care.[7] Rushikash Maru has commented that in India, a highly bureaucratic program structure can achieve one-time performance (e.g., meeting sterilization targets), but its success in providing methods that require follow-up care is limited.[8] In fact, the most pertinent question is how to overcome this bureaucratic weakness so the program can utilize a wider range of methods. Anrudh K. Jain has observed that monitoring continuation rates alone is inadequate in identifying areas of strength and weakness, and that guided management toward program improvement is required instead.[9]

We undertook a large-scale study to investigate the relationship between input into the Indian family planning program in rural areas and the contraceptive acceptance rate at the PHC level. Its goals were to ascertain the personnel, training, and medical and service-related resources actually deployed at the PHC level, to study interrelationships between program components and the socioeconomic conditions of the population in which they are deployed, and to measure the impact of family planning program input on contraceptive acceptance.

Methodology

The study was conducted in the states of Karnataka, Maharashtra, Tamil Nadu and West Bengal; the CPR varied substantially in these states, from 30 percent in West Bengal to 55 percent in Maharashtra. Since PHCs are expected to maintain records on program input and performance, we compiled the necessary data through a structured questionnaire administered at each PHC. Various sections of the questionnaire covered background characteristics of the PHC, including the size of the population served, the number of subcenters and their distances from the PHC, the number of villages served and the length of time the center had been functioning; family planning program resources, including medical and paramedical personnel (both in position and sanctioned), their training, and the availability of medical and service-related facilities; acceptance rates of four official methods of family planning (sterilization, the IUD, the condom and the pill); and the functions and activities of the PHCs, including budget, incentives, maternal and child health services, and input from medical officers for the improvement of the program.

The data for this study, collected in 1987, concerned the medical and service-related facilities available at the PHC level. Data on personnel, however, covered all physicians in a PHC, including health department physicians posted either in the PHC or in subunits within the PHC's jurisdiction (such as primary health units in Karnataka and subsidiary health centers in West Bengal). Sanctioned posts for paramedics were at the subcenter level (i.e., grass-roots units providing preventive and promotive health services to populations of 5,000–10,000); the staffs of such subcenters have been included as PHC staff. Urban facilities and personnel have not been included, as the study was confined to rural areas of the states.

Data on program input for personnel, for medical and service facilities, for training, and for information, education and communication activities were collected from all PHCs in a district for the fiscal year 1986–1987. Data on family planning performance of the PHCs were obtained for fiscal years 1984–1985, 1985–1986 and 1986–1987. The information was compiled by statistical assistants in each district, who had been given training on the definitions of various terms used and on data to be compiled. The training of all statistical assistants within a state was carried out at state headquarters.

Information on socioeconomic and demographic characteristics of the rural population for each district and on the rural population covered by each PHC was compiled from 1981 census publications. Table 1 (page 16) provides the characteristics of the four states, the number of PHCs in each state and the proportion from which information was received. For example, of 2,510 PHCs in the four states, data were compiled from 87 percent, with this proportion ranging from 84 percent in Maharashtra to 95 percent in Tamil Nadu.

On the basis of the information collected from these sources, the following variables were used in the analysis of interrelationships:

- *Family planning program performance measures*—average number of sterilizations per 1,000 population per year (from April 1, 1984, to March 31, 1987) in a PHC area; and average number of IUD insertions per 1,000 population per year (from April 1, 1984, to March 31, 1987) in a PHC area.
- *Family planning program input measures*—**Personnel:** number of doctors per 100,000 population in a PHC area; whether the PHC has at least one medical officer trained in laparoscopy or tubectomy (no=0; yes=1); number of female paramedics per 100,000 population in the PHC area;[*] and number of dais (trained traditional birth attendants) per 1,000 population in the PHC area. **Medical, service and other facilities:** whether the PHC has an operating theater (no=0; yes=1); whether the PHC has adequate medical facilities

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[*] Only female paramedics such as auxiliary nurse-midwives and public health nurses have been included in the present analysis, because the role of these female workers has become more crucial in recent years in the promotion of program performance. In addition, in Tamil Nadu (and, to some extent, in Maharashtra), exact information on the number of male paramedics at the subcenter level was not uniformly provided because of administrative difficulties. Therefore, we decided to exclude information on male paramedics from this analysis.

Table 1. Basic demographic and family planning program characteristics, four selected Indian states

Characteristic	State			
	Karnataka	Maharashtra	Tamil Nadu	West Bengal
1981 population (in 000,000s)	37.1	62.8	48.4	54.6
% of population in rural areas, 1981	71.1	65.0	67.0	73.5
% literate among women ages ≥15, 1981	28	35	35	33
Per-capita net domestic product at 1984 prices (in rupees)	2,136	3,430	2,353	2,813
Total fertility rate, 1984	3.8	3.8	3.3	3.9
Life expectancy at birth—both sexes, 1984	62	61	58	56
Couple protection rate, Mar. 1987	39.7.	54.9	46.3	29.5
No. of public health centers (PHCs)	465	1,378	382	285
% of PHCs for which information was received	88.2	84.2	94.5	86.3

Sources: 1981 population, percentage of the population living in rural areas, percentage literate among women age 15 and older, per-capita net domestic product and couple protection rate—Ministry of Health and Family Welfare, *Family Welfare Programme in India Year Book 1986–87*, Government of India, New Delhi, 1988, Tables A.2.2, C.8, C.2.1 and E.2; total fertility rate—*Sample Registration System, 1984*, statement 25, p. 43, Vital Statistical Division, Ministry of Home Affairs, New Delhi, 1986; and life expectancy—S. Parsuraman, computed from "SRS Age-Specific Death Rate for 1984," mimeo, International Institute for Population Sciences, Bombay, 1987.

(no=0; yes=1);* whether the PHC has adequate service-related facilities (no=0; yes=1);† whether at least one doctor is staying in the staff quarters or in the PHC area (no=0; yes=1); and whether the PHC has at least one vehicle in working condition (no=0; yes=1). **Incentives:** whether the PHC offers incentives other than those provided through the official government program (no=0; yes=1).‡

- *Socioeconomic measures*—percentage of literate women and percentage of never-married women aged 15–19 in rural areas of the district; percentage of the district's population that is rural; percentage of the district's rural male population engaged in nonagricultural work; and percentage of scheduled castes,§ percentage of scheduled tribes, and percentage of Muslims in the district's rural population.

Data on the input variables were compiled for each PHC in the four states. Information on the number of family planning acceptors was compiled from PHC service statistics, and the acceptance rate was computed using information on the rural population of the PHC area, which was drawn from the census records. The socioeconomic variables (dating from 1981) for each PHC are district-level figures, because no such data were available for the PHC populations.

The family planning performance of PHCs was assessed only in terms of sterilization and the IUD for three reasons. First, particularly in rural areas, sterilization continues to be the most popular contraceptive method, used by the majority of the population. Second, the IUD (especially the Copper-T) has been systematically promoted by the program since 1981. Third, the statistics on other methods of family planning, such as condoms and the pill, are of poor quality.

This analysis may appear to be limited by the fact that in certain family planning program measures—the number of doctors, paramedics and dais—and in the performance indictors, the numerators pertain to 1986–1987, while the denominators refer to the estimated population of the PHC area based on 1981 census figures (the only reliable source of information on the size of the population at the village or PHC level). However, it is useful to relate the input variables to 1981 census data, since resources have been deployed to the PHCs and all official computations of rates and targets have been made on the basis of census data. We also believe that the rural population of the districts in a given state had not experienced any abrupt change in socioeconomic and demographic characteristics over the five years between the 1981 census and the 1986 measures of program input. Therefore, we assume that the differential pattern of growth rates of the rural population has remained unchanged in the selected four states during the period in question.

Relating the average number of sterilizations and IUD insertions to the number of eligible couples in the PHC area might have provided more precise measures of family planning performance, but in the absence of such information, the estimate of the total population of the area based on the 1981 census was the only alternative. The use of 1981 census figures affects the family planning performance rate in absolute terms, leading to an overestimate of the performance rates, but the indexes nonetheless provide the basis for comparing differential performance across PHCs and analyzing program factors behind it.

Logically, one could question how well family planning acceptance rates based on averages for 1984–1987 can be related to program input for 1986–1987, when input should ideally relate to 1984 or 1985. However, preliminary analyses revealed that annual acceptance rates of sterilization and rates of IUD insertion were remarkably stable from 1984 on, and average annual rates between 1984 and 1987 can be taken to represent acceptance for 1986–1987. In addition, precise PHC-level data on various program inputs were not available for any time prior to 1986–1987. Further, family planning program services have been built up over a period of two decades, and one can assume that PHC-level input measured in 1986–1987 was a close approximation of the situation in 1985–1986. Finally, the present study is a comparative analysis of the situation of the various PHCs in different states, not an attempt to specify the actual acceptance rate at some particular time.

Results

- *Program input and socioeconomic conditions.* Table 2 depicts levels of program input and performance for each of the four states, classified according to the PHC dis-

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*We compiled information on seven aspects of the medical facilities deployed in a PHC: a ward; a dispensary; a laboratory; a labor room; abortion services; thermocol boxes (which allow health workers to transport vaccine while keeping it at the specified temperature); and a sterilizer. A PHC was considered to have adequate medical facilities if it had any six of these seven resources, and inadequate facilities if had any less than six.

†The measure of service-related facilities consisted of five items: waiting space; a doctor's room; a toilet; a cupboard; and electricity. Facilities were considered adequate if any four of these were present, and inadequate if less than four were available.

‡While there is a standard incentive payment that is to be given to acceptors of various methods (e.g.. Rs. 150—about U.S. $9—to a man who becomes sterilized, and Rs. 195—about U.S. $12—to a woman who becomes sterilized), PHCs are permitted to pool incentives (in cash or kind) from various other sources, such as other government organizations, voluntary organizations and other local bodies.

§In India's hierarchical caste system, some castes are considered extremely backward and are called "untouchables" by the rest of society. After independence in 1947, to improve these groups' socioeconomic conditions, the government of India identified many of these castes in a "schedule" and gave special preferences to them in admission to schools, in employment and in politics. These castes are called "scheduled castes." Similar groups living in hilly or interior areas that have been singled out for such privileges are termed "scheduled tribes."

Table 2. Mean value of program input and performance, by component, according to state and level of socioeconomic development among PHCs

Program input and performance components	State and socioeconomic level															
	Karnataka				Maharashtra				Tamil Nadu				West Bengal			
	All	High	Med.	Low	All	High	Med.	Low	All	High	Med.	Low	All	High	Med.	Low
Program Input																
No. of MDs per 100,000 in PHC area	3.09	3.06	3.09	3.10	6.52	7.02	6.40	5.73	2.78	2.91	3.06	2.40	3.78	4.13	3.72	3.72
No. of paramedics per 100,000 in PHC area	28.2	34.2	28.3	25.1	33.7	36.2	31.2	32.5	25.3	28.6	23.2	25.8	23.6	24.1	23.6	23.1
PHC has at least one MD trained in laparoscopy or tubectomy	0.64	0.60	0.66	0.64	0.75	0.72	0.77	0.78	0.38	0.36	0.31	0.47	0.74	0.69	0.76	0.74
No. of trained dais per 100,000 in PHC area	0.79	0.89	0.84	0.70	0.91	0.98	0.84	0.90	0.90	0.83	0.89	0.94	0.80	0.85	0.72	0.89
At least one MD stays in staff quarters or PHC area	0.89	0.91	0.87	0.89	0.78	0.75	0.80	0.79	0.96	0.96	0.97	0.95	0.95	0.97	0.96	0.92
PHC has operating theater	0.65	0.72	0.66	0.60	0.59	0.56	0.56	0.69	0.85	0.78	0.88	0.84	0.59	0.46	0.56	0.71
PHC has at least one working vehicle	0.88	0.87	0.85	0.92	0.88	0.87	0.87	0.92	0.98	0.99	0.97	0.99	0.56	0.67	0.53	0.54
PHC has adequate medical facilities	0.69	0.76	0.71	0.65	0.21	0.23	0.21	0.20	0.54	0.49	0.56	0.56	0.41	0.49	0.37	0.44
PHC has adequate service facilities	0.77	0.80	0.79	0.73	0.61	0.63	0.57	0.63	0.92	0.95	0.91	0.92	0.33	0.26	0.30	0.42
PHC offers additional incentives	0.57	0.65	0.54	0.57	0.51	0.52	0.51	0.50	0.24	0.18	0.18	0.36	0.06	0.08	0.06	0.04
Program Performance																
Avg. annual no. of sterilizations per 1,000 population in PHC	9.20	8.80	9.33	9.28	9.92	10.46	9.92	8.86	6.02	6.41	5.13	6.83	5.34	5.70	5.27	5.26
Avg. annual no. of IUD insertions per 1,000 population in PHC	4.65	5.01	4.68	4.43	10.05	9.55	9.87	11.31	2.53	3.56	2.44	2.05	1.15	1.18	1.10	1.23

trict's level of socioeconomic development.* Maharashtra, the only state with a PHC for every 30,000 population, leads in the provision of medical and paramedical personnel to its rural population. There were 6.5 physicians per 100,000 population, on average—close to the standard for a PHC of providing two medical officers per 30,000 population. Maharashtra also has an average of 34 paramedics per 100,000 population, close to the expectation that the average PHC of 30,000 people will have about 10 paramedics.† In addition, 74 percent of its PHCs were found to have the services of a medical officer trained in laparoscopy or tubectomy.

In the other three states, the number of workers available to rural residents was well below the prescribed standard. In Tamil Nadu and West Bengal, where each administrative unit still covers about 100,000 people, the ratios of both doctors and paramedics to population are inadequate. The scarcity of doctors was most apparent in Tamil Nadu, where there were fewer than three doctors per 100,000 population, and where only 38 percent of PHCs had the services of a doctor trained in laparoscopy or tubectomy. West Bengal was most lacking in paramedical personnel (with 24 per 100,000 population), although the availability of such workers was also below the norm in Tamil Nadu (25 per 100,000) and Karnataka (28 per 100,000).

In Maharashtra, more than 94 percent of PHCs reported having at least 75 percent of the expected number of paramedics available (not shown); this proportion was 80 percent in West Bengal, with the other two states falling between these two levels. In all four states, there was a significant positive correlation between the number of doctors and the number of paramedics per 100,000 population: the higher the number of doctors in a PHC, the greater the chance that there was a relatively large number of paramedics, while a smaller number of doctors indicated a lower likelihood of a large number of paramedics. This may appear to be the logical result of the deployment of personnel, but the lack of both doctors and paramedics in some PHCs represents a major problem; except in Maharashtra, the proportion of such PHCs is likely to have been sizable. All states have made satisfactory progress in meeting the national standard of one dai per 1,000 population in rural areas, although none of them has really achieved the target.

Table 2 also shows that 95 percent or more of PHCs in Tamil Nadu and West Bengal provided housing for at least one

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*Using available data for five socioeconomic indicators (the percentage of women who are literate, the proportion of 15–19-year-olds who are single, the percentage of the population living in rural areas, the percentage of males engaged in nonagricultural work, and the percentage of Muslims in the 1981 census), we calculated a composite score for each district of a state by pooling the ranks given to the above five variables. The distribution of the composite score was then partitioned equally into three parts: Districts with a composite score falling above the 67 percent cut-off were classified as high socioeconomic status, those with a composite score between 33 percent and 67 percent were classified as medium, and those with a score below 33 percent were classified as low.

†The standard number of paramedical personnel per PHC is worked out on the basis of the size of the population to be served. A PHC with 30,000 people is supposed to have six auxiliary nurse-midwives, and a supervisor for every four nurse-midwives. In addition, each PHC has one other female paramedic and a public health nurse, making the total about 10 female paramedics per PHC.

Table 3. Proportion of PHCs having particular combinations of program components, and average number of sterilizations and average number of IUD insertions in PHCs with these combinations, by state

Combinations	State and measure											
	Karnataka			Maharashtra			Tamil Nadu			West Bengal		
	% of PHCs	Avg. no. of sterilizations	Avg. no. of IUD insertions	% of PHCs	Avg. no. of sterilizations	Avg. no. of IUD insertions	% of PHCs	Avg. no. of sterilizations	Avg. no. of IUD insertions	% of PHCs	Avg. no. of sterilizations	Avg. no. of IUD insertions
At least one trained MD, at least one MD staying in PHC area, adequate paramedics, an operating theater, and a working vehicle	37	9.35	4.65	40	12.20	12.24	29	6.10	2.42	19	5.42	1.07
At least one trained MD, adequate paramedics, an operating theater, and a working vehicle	37	9.33	4.62	45	11.76	11.72	30	6.09	2.41	20	5.51	1.05
At least one trained MD, an operating theater, and a working vehicle	47	9.31	4.58	48	11.69	11.73	32	6.19	2.34	26	5.71	1.12
At least one trained MD and a working vehicle	59	9.33	4.66	67	10.58	10.77	37	6.01	2.33	41	5.68	1.17
At least one trained MD and an operating theater	50	9.40	4.60	52	11.82	11.93	33	6.12	2.32	47	5.50	1.18
At least one trained MD, but no operating theater	14	na	na	23	na	na	5	na	na	27	na	na
No trained MD, but an operating theater	16	na	na	10	na	na	52	na	na	11	na	na

doctor. In Maharashtra, on the other hand, a doctor was living in only 78 percent of PHCs. The number of PHCs in Maharashtra has swelled in recent years because many of its subcenters were converted into PHCs by the addition of doctors and paramedics, but the state appears to have had problems coping with the need to provide residential facilities.

Facilities such as an operating theater and a working vehicle were available in the greatest proportion of PHCs (85 percent and 98 percent, respectively) in Tamil Nadu. In West Bengal and Maharashtra, an operating theater was available in 59 percent of PHCs, while the proportion was slightly higher in Karnataka (65 percent). One roadworthy vehicle was available in at least 88 percent of PHCs in each of the states but West Bengal.

The Tamil Nadu program seems to have emphasized the provision of physical facilities, although in terms of personnel it has lagged considerably. The situation in Maharashtra, on the other hand, is the opposite, with most PHCs having adequate personnel but lagging behind even Karnataka in physical facilities. The absence of adequate medical facilities was particularly evident: A mere 21 percent of PHCs in Maharashtra reported having such facilities. This finding leaves one wondering what the quality of services provided by a PHC could be if it lacks even basic medical facilities. Service-related facilities were extremely unsatisfactory in West Bengal, and were less than ideal in Maharashtra and Karnataka. The latter two states were most likely to have PHCs that offered incentives beyond those routinely provided by the family planning program, while PHCs in Tamil Nadu were less likely to do so and those in West Bengal generally did not.

A comparative analysis of input in the four states according to prevailing socioeconomic conditions in the PHCs reveals that within each state, the distribution of the majority of the program components shown in Table 2 was not greatly influenced by the PHC's socioeconomic climate. However, an interesting interstate variation emerges regarding the deployment of a few of these components. For example, in West Bengal, a significantly higher proportion of PHCs in areas of low socioeconomic development had an operating theater and adequate service-related facilities than did PHCs in more highly developed areas; in the other three states, there were few socioeconomic differences in the deployment of these facilities. Likewise, in Tamil Nadu, PHCs in areas of low socioeconomic development were more likely to have reached the targeted standard for trained dais and to have at least one doctor trained in sterilization procedures than were PHCs in more developed areas.

About 40 percent of PHCs in less developed areas of Tamil Nadu offered additional incentives to family planning acceptors, compared with less than 20 percent of PHCs in high-and medium-development areas. In the other states, extra incentives were offered uniformly in all PHCs; in fact, in Karnataka and Maharashtra, the majority of the input at the PHC level seems to be distributed regardless of local socioeconomic development. For example, the average number of doctors in Maharashtra PHCs of higher socioeconomic development was 7.6 per 100,000 population, compared with 6.9 per 100,000 in areas of medium socioeconomic development and 6.1 per 100,000 in areas of low socioeconomic development; in Karnataka, the respective rates were 3.0, 3.3 and 3.1 per 100,000.

Thus, the distribution of family planning program components in the PHCs appears to be related to local socioeconomic development only with regard to the provision of facilities (an operating theater and medical and service-related facilities) and of incentives. This finding suggests that except for a few components in West Bengal and Tamil Nadu, there has been no selective deployment of input to areas that are socioeconomically deprived. If we assume that such areas are likely to have fewer nongovernmental medical and paramedical facilities, then increased investment of public resources on medical and other facilities must compensate for this deficiency. Program managers planning to deploy resources into rural areas should probably take note of an area's socioeconomic conditions, rather than simply considering the size of its population.

•*Program performance and socioeconomic conditions*. As with program input, there were striking variations in the acceptance of sterilization and the IUD in the four states. For example, the average acceptance rates for sterilization and the IUD in Maharashtra were 9.9 and 10.1 acceptors per 1,000 population, respectively (see Table 2). In contrast, West Bengal's acceptance rates for these two methods were 5.3 and 1.2 per 1,000, respectively. Except in Maharashtra, IUD acceptance was much lower than sterilization acceptance.

Socioeconomic differentials in the acceptance of both sterilization and the IUD were most striking in Maharashtra and Tamil Nadu. However, contrary to our general expectations, these associations varied in direction: In Maharashtra, sterilization acceptance rose with socioeconomic development (from 8.9 per 1,000 in low-socioeconomic-status areas to 10.5 per 1,000 in high-socioeconomic-status areas), while IUD acceptance was higher in low-socioeconomic-status areas (11.3 per 1,000) than in high-socioeconomic-status areas (9.6 per 1,000). In West Bengal and Karnataka, on the other hand, there was little variation in program performance according to the level of socioeconomic development.

Family Planning Packages

It is generally believed that family planning components are most effective in coverage and quality when they are deployed as a package. For example, if a PHC has a trained doctor, an operating theater, adequate paramedical personnel and a working vehicle, it should be more effective than when one or more of the above components is absent. To study the extent to which services are provided in packages, we examined seven input combinations.

The first and most desirable package included the presence of at least one doctor trained in sterilization techniques, at least one doctor staying in the PHC area, the presence of at least 75 percent of the mandated paramedical staff, the availability of an operating theater and a working vehicle. The next highest priority combination consisted of all of the above components except having at least one doctor staying in the area of the PHC. A third, less desirable, combination consisted of one trained doctor, an operating theater and a roadworthy vehicle. The fourth and fifth combinations represented the minimum that a PHC should have—one trained doctor and a working vehicle, or a trained physician and an operating theater. Thus, each PHC was studied in terms of a range of input, from the ideal to the bare minimum. Further, to examine administrative anomalies, two mismatches were also examined—the percentage of PHCs with a trained doctor but without an operating theater, and the percentage of PHCs with an operating theater but no physician.

As shown in Table 3, the majority of PHCs were not equipped with the most ideal combination of attributes; Maharashtra had the highest proportion, with 40 percent. The situation was particularly disappointing in West Bengal, where only 26 percent of PHCs had even the third-best combination of resources. The percentage of PHCs with the minimum essential packages of inputs varied from only 33–37 percent in Tamil Nadu to 52–67 percent in Maharashtra.

The table also reveals that in three of the four states (Karnataka, Tamil Nadu and West Bengal), there was no relationship between the addition of a crucial input variable and the PHC's performance. In Karnataka, for example, the average number of sterilizations in PHCs with the ideal combination of components (9.4 per 1,000) was no different from the average in PHCs with the minimum acceptable set (9.3–9.4 per 1,000). In Maharashtra, there was a systematic rise in sterilization and IUD acceptance rates with the inclusion of additional inputs, but the increase was not as striking as might have been expected. There is no logical explanation for the lack of association between the range of program inputs and program performance. However, it could be explained in part by the fact that sterilization camps were regularly organized in different parts of the states, and these pooled resources from various PHCs and from headquarters.

Table 3 also indicates the extent of mismatches in inputs. In some places, program inputs were deployed somewhat arbitrarily: In Tamil Nadu, 52 percent of PHCs had an operating theater but not a doctor trained in sterilization; in West Bengal, 27 percent of PHCs had a trained physician but no operating theater. In Karnataka, both types of mismatches could have been reduced considerably if doctors in the 14 percent of PHCs with no operating theater were transferred to the 16 percent of PHCs with an operating theater but no physician trained to do sterilizations. This situation suggests that the provision of facilities to PHCs has not been planned or monitored closely, and that some program inputs have been used wastefully or inefficiently.

Multivariate Analyses by State

To study the nature of the relationship between program input and sterilization and IUD acceptance, we conducted hierarchical analyses of variance and multiple classification analyses.* First, however, we conducted a stepwise regression analysis to identify the program components that had a greater (although not necessarily statistically significant) influence on sterilization or IUD acceptance; these were introduced into the multiple classification analysis. Furthermore, a set of covariates—essentially social, structural or economic characteristics of the population—was selected on the basis of a stepwise regression analysis and was used to study the impact of the program components after the effects of these covariates were taken into account. All variables found to be significant for any of the four states were included. The addition of program input factors or of socioeconomic variables other than those already included in the model did not improve its explanatory power for any of the four states. The findings of the analysis are presented separately for each state.

•*Karnataka*. Table 4 (page 20) provides the results of the multiple classification analysis and the analysis of variance for the state of Karnataka. Among the seven program components considered in the multiple classification analysis, the variable with the maximum explanatory power was the number of trained physicians per 100,000 population, which explained seven percent of the variability when the other factors and covariates were ignored (η^2) and about six percent after the effects of all covariates were controlled for (β^2). The effect of this factor on levels of steriliza-

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*For the analyses, the three program inputs defined on an interval scale (the number of doctors, the number of paramedics and the number of dais) were transformed into ordinal scales, by converting them into categories of low (0), medium (1) and high (2), according to whether a particular value fell below 33 percent, between 33 percent and 67 percent, or above 67 percent in the distribution.

Table 4. Unadjusted and adjusted mean acceptance rates of sterilization and of the IUD, by type of analysis and program input, Karnataka

Analysis and program input	Sterilization			IUD		
	No. of PHCs	Unadjusted mean	Adjusted mean	No. of PHCs	Unadjusted mean	Adjusted mean
MULTIPLE CLASSIFICATION ANALYSIS						
No. of MDs						
0	107	8.06	8.18***	107	3.99	4.09***
1	119	8.77	8.81	119	4.38	4.42
2	120	10.51	10.35	120	5.48	5.35
Coefficient		η=.27	β=.24		η=.31	β=.26
No. of paramedics						
0	111	8.18	8.86	111	3.82	4.19***
1	118	8.70	8.73	118	4.62	4.63
2	117	10.53	9.85	117	5.44	5.08
Coefficient		η=.26	β=.13		η=.32	β=.17
No. of dais						
0	113	8.54	8.86	113	4.18	4.43
1	116	9.05	9.12	116	4.65	4.68
2	117	9.84	9.46	117	5.07	4.81
Coefficient		η=.14	β=.06		η=.18	β=.08
At least one trained MD						
0	224	9.33	9.29	224	4.66	4.65
1	122	8.82	8.88	122	4.60	4.62
Coefficient		η=.06	β=.05		η=.01	β=.01
Adequacy of medical facilities						
0	255	9.38	9.06	255	4.75	4.59
1	91	8.50	9.39	91	4.35	4.79
Coefficient		η=.10	β=.04		η=.08	β=.04
Adequacy of service facilities						
0	278	9.42	9.36	278	4.75	4.59
1	68	8.04	8.23	68	4.17	4.29
Coefficient		η=.14	β=.12		η=.11	β=.08
At least one MD staying in PHC area						
0	311	9.20	9.14	311	4.67	4.65
1	35	8.70	9.27	35	4.34	4.54
Coefficient		η=.04	β=.01		η=.05	β=.02
R^2			35.0			36.3
ANALYSIS OF VARIANCE†						
R^2			43.2***			47.6***

Note: In this and subsequent tables, *=statistically significant at p<.05; **=statistically significant at p<.01; ***=statistically significant at p<.001.

†In this and subsequent tables, the seven program input factors listed for the multiple classification analysis were used in the hierarchical analysis of variance, as were six covariates: percentage of women who are literate; proportion of never-married women who are 15–19; proportion of the population that is rural; proportion of the population that is of scheduled castes; percentage of population that is of scheduled tribes; and percentage of Muslims. None of the second-order or higher order interactions among the program input factors were statistically significant. Among the 21 potential first-order interactions, only two (number of paramedics with number of dais, and number of dais with presence of at least one MD trained to do female sterilizations) were found to be significant for IUD acceptance in Karnataka.

tion and IUD acceptance (as assessed from the adjusted mean values) is systematic and positive: The PHCs with the highest density of doctors were found to have a sterilization acceptance rate about 2.2 points higher and an IUD acceptance rate about 1.3 points greater than the PHCs with the lowest density of doctors. Similarly, the availability of paramedical personnel (mainly auxiliary nurse-midwives) also contributed significantly to IUD acceptance rates. No other program input was found to have a significant effect on contraceptive acceptance.

All 13 variables in the analysis of variance accounted for 43 percent of the overall variance in sterilization acceptance and for 48 percent of variance in IUD use, compared with 35 percent and 36 percent, respectively, that were explained in the multiple classification analysis. The major difference is that the former method included interaction effects (not necessarily statistically significant), while the latter ignored them. These results indicate that there was very little interaction among these variables: Besides two interaction effects in the case of IUD acceptance (between the number of paramedics and number of dais and between the number of doctors trained in sterilization techniques and number of dais), no second-order interactions among the program components turned out to be significant in the analysis of variance. Most program components deployed in Karnataka's family planning program, then, have contributed independently to contraceptive acceptance, especially of sterilization. This is not unexpected, considering that targets are assigned to individual workers, and that an individual's work is judged on the basis of his or her performance compared with that target. Thus, it appears that the program could not gain momentum in Karnataka because of a lack of organized group efforts and because of ad hoc decision-making in the deployment of program resources.

Another important observation based on this analysis is that almost 57 percent of the variability in the acceptance rate of sterilization and 52 percent of the variability in IUD acceptance remained unexplained. We propose several hypotheses to explain this failure; all should be explored in more in-depth studies.

First, the deployment of personnel and facilities may not be as important as the extent to which these personnel and facilities are used effectively. The presence of an organizational structure does not imply that it functions; for it to do so effectively, program resources and facilities need to be managed properly. Our findings indicate that management interventions, which are crucial to the full utilization of program input, must be incorporated in any input-output analysis.

Second, personnel and facilities from various governmental departments other than the public health and family welfare department are frequently used to meet targets, especially during February and March, when the state government wants to reach previously set targets in hopes of winning awards and certificates from the central government. Thus, the whole governmental machinery is geared to attaining the targets close to the end of the fiscal year through crisis management. Under such circumstances, family planning program resources deployed through the health and family welfare department probably play only a limited role.

Third, since 1985–1986, there has been a shift in program strategy, with a greater

Table 5. Unadjusted and adjusted mean acceptance rates of sterilization and of the IUD, by type of analysis and program input, Maharashtra

Analysis and program input	Sterilization			IUD		
	No. of PHCs	Unadjusted mean	Adjusted mean	No. of PHCs	Unadjusted mean	Adjusted mean
MULTIPLE CLASSIFICATION ANALYSIS						
No. of MDs						
0	275	8.85	9.48***	278	9.76	10.54**
1	310	10.47	10.59	312	10.53	10.65
2	307	12.04	10.59	307	12.37	11.54
Coefficient		η=.15	β=.09		η=.10	β=.04
No. of paramedics						
0	289	9.41	9.86**	289	9.11	9.51***
1	298	9.87	10.10	302	10.56	10.54
2	305	12.18	11.52	306	13.01	12.63
Coefficient		η=.14	β=.09		η=.14	β=.11
No. of dais						
0	297	9.40	9.56***	298	8.62	8.80***
1	288	9.67	9.88	293	9.91	9.93
2	307	12.37	12.02	306	14.13	13.93
Coefficient		η=.16	β=.13		η=.21	β=.19
At least one trained MD						
0	671	11.03	10.73***	671	11.47	11.05*
1	221	8.93	9.86	226	9.29	10.53
Coefficient		η=.11	β=.04		η=.08	β=.02
Adequacy of medical facilities						
0	209	16.10	15.09***	208	16.06	14.88***
1	683	8.80	9.11	689	9.37	9.73
Coefficient		η=.36	β=.30		η=.25	β=.19
Adequacy of service facilities						
0	571	11.85	10.81	571	12.28	11.29
1	321	8.12	9.97	326	8.54	10.27
Coefficient		η=.21	β=.05		η=.16	β=.04
At least one MD staying in PHC area						
0	704	11.17	10.88**	710	11.57	10.51**
1	188	8.03	9.12	187	8.45	9.35
Coefficient		η=.15	β=.08		η=.11	β=.07
R^2			20.0			16.4
ANALYSIS OF VARIANCE						
R^2			22.3***			19.0***

emphasis on spacing methods. Under such conditions, program input could have been expected to play a greater role in explaining the variability in the acceptance of spacing methods than of sterilization. Unfortunately, the data available on the use of spacing methods (like the condom and the pill) at PHCs are not reliable, and no such detailed analysis could be done.

The relatively small proportion of the variance explained in the present analysis suggests that one or more of the above factors may have had a strong influence. Testing these hypotheses, however, requires a separate analysis that treats the acceptance rates for sterilization and for all spacing methods as dependent variables and information on the management aspects of the family planning program and the role of departments other than the health department in the operation of the program as predictors.

•*Maharashtra*. Table 5, which presents findings from the state of Maharashtra, reveals that six of the seven program inputs contributed significantly to explaining the variability in sterilization and IUD acceptance rates; all were in the expected direction. The maximum effect was in the case of medical facilities and physicians' housing. Thus, while the availability of program personnel had the largest effect in Karnataka, the availability of facilities had the greatest impact on acceptance rates in Maharashtra. This may be related partly to the very high density of program personnel in all PHCs in Maharashtra.

The percentage of variance in the sterilization rate explained by all 13 variables in the multiple classification analysis is 20 percent, compared with 22 percent explained in the analysis of variance. In the case of the IUD, the respective percentages of the variance explained by these variables were 16 percent and 19 percent. Any interaction effects are small, suggesting once again that the various program components are not interacting. That 78 percent of the variability in the rate of sterilization acceptance and 81 percent of variance in the IUD acceptance rate remained unexplained indicates that the three issues raised with regard to Karnataka require more careful attention in Maharashtra as well.

•*Tamil Nadu*. Table 6 (page 22) shows that in Tamil Nadu, the amount of the variance explained by the 13 variables considered in the analysis of variance is discouragingly low—only nine percent in sterilization acceptance and about 19 percent in IUD acceptance. Among the program components considered, the variable that had the greatest effect on sterilization acceptance was service-related facilities (beta coefficient of .10). Surprisingly, this effect is the opposite of what one would generally expect: The analysis suggests that PHCs having inadequate service-related facilities performed better than those with adequate facilities. However, none of the input factors had a significant effect on sterilization acceptance. Regarding IUD acceptance rates, the number of dais, the number of doctors trained to do sterilizations and the number of paramedics had significant effects.

These results must be interpreted in the context of this state's organizational and program implementation, though. In Tamil Nadu (formerly Madras state), the family planning program has been viewed since its inception in 1951 as a state-run program to which all government departments are committed. It was the first state to introduce an incentive-related vasectomy program, and from the late 1950s placed an emphasis on achieving targets. The machinery of all government departments is routinely mobilized to achieve the set targets. Thus, family planning program resources deployed directly through the network of PHCs can be expected to play a relatively minor role in determining the overall acceptance of family planning.

Further, there has been tremendous political support in Tamil Nadu over five decades for the small-family norm, particularly by the popular regional party Dravida Munnettra Kazhagam, which, like its predecessors, has emphasized the need for small families if the economic well-

Table 6. Unadjusted and adjusted mean acceptance rates of sterilization and of the IUD, by type of analysis and program input, Tamil Nadu

Analysis and program input	Sterilization			IUD		
	No. of PHCs	Unadjusted mean	Adjusted mean	No. of PHCs	Unadjusted mean	Adjusted mean
MULTIPLE CLASSIFICATION ANALYSIS						
No. of MDs						
0	104	5.33	5.49	104	2.43	2.72^{**}
1	110	5.91	5.79	110	2.13	2.17
2	108	7.06	7.03	108	3.03	2.72
Coefficient		η=.11	β=.10		η=.20	β=.14
No. of paramedics						
0	107	5.51	5.46	107	2.04	2.32^{*}
1	104	5.83	6.15	104	2.52	2.51
2	111	6.94	6.71	111	3.01	2.76
Coefficient		η=.09	β=.08		η=.21	β=.16
No. of dais						
0	107	6.36	6.15	107	2.13	2.08
1	114	5.68	5.53	114	2.54	2.56
2	101	6.34	6.71	101	2.90	2.97
Coefficient		η=.14	β=.06		η=.16	β=.20
At least one trained MD						
0	124	6.00	6.26	124	2.30	2.43
1	198	6.18	6.02	198	2.67	2.59
Coefficient		η=.01	β=.02		η=.10	β=.04
Adequacy of medical facilities						
0	174	5.75	6.16	174	2.60	2.57
1	148	6.53	6.05	148	2.44	2.48
Coefficient		η=.06	β=.01		η=.04	β=.02
Adequacy of service facilities						
0	297	5.85	5.91	297	2.59	2.56
1	25	9.18	8.44	25	1.77	2.17
Coefficient		η=.13	β=.10		η=.12	β=.06
At least one MD staying in PHC area						
0	314	6.06	6.06	314	2.56	2.55
1	8	8.16	8.00	8	1.29	1.93
Coefficient		η=.05	β=.04		η=.11	β=.05
R^2			8.7			18.7
ANALYSIS OF VARIANCE†						
R^2			8.7^{*}			18.7^{***}

†The percentages of the variance explained in the multiple classification analysis and analysis of variance are the same because higher order interactions were suppressed as a result of empty cells or a singular matrix. Analyses carried out with fewer input factors and covariates, including interaction effects, also revealed no significant differences between the percentage of variance explained by the two approaches.

being of the state is to be improved and the status of women raised. Thus, the political climate set by the government also strongly supports the family planning program.

These two factors together probably play a key role in the state's record of achieving family planning targets and reducing fertility. Tamil Nadu recorded India's lowest marital fertility levels in 1986 and the lowest growth rate during 1971–1981. If the effects of family planning program input are to be assessed accurately, we must introduce into the analysis such factors as management characteristics, the contribution of departments other than the health department and the strong political support for the small-family norm.[10] Otherwise, it may not be possible to ascertain the true effect of the direct measures considered in our analysis.

- *West Bengal.* The multiple classification analysis and the analysis of variance presented in Table 7 indicate that the maximum effect for both sterilization and IUD acceptance was caused by the number of paramedics, the adjusted effect being .27 and .26, respectively. The number of doctors trained to do sterilizations also contributed significantly to explaining the variance in acceptance rates. On the whole, personnel-related program components seem to have had a greater effect in West Bengal than has facility-related input.

The percentage of the variance in the acceptance of sterilization explained by all 13 variables was 33 percent in the multiple classification analysis and 44 percent in the analysis of variance, while the respective percentages of explained variance in IUD acceptance were 33 percent and 49 percent. These analyses also suggest a lack of significant interaction effects at the PHC level.

Discussion

Among the four states considered in the multiple classification analysis, the greatest percentage of the variance in sterilization acceptance explained by program input and socioeconomic variables was in Karnataka (35 percent); smaller percentages of the variance were explained in West Bengal (33 percent), Maharashtra (20 percent) and Tamil Nadu (nine percent). The amount of the variance in IUD acceptance explained by these predictors was generally the same in each respective state as in the case of sterilization. The effects of two particular program inputs differed widely among states, however: The number of doctors trained in sterilization techniques at the PHC level had a greater impact than the number of paramedics in Karnataka and Maharashtra, while in West Bengal the number of paramedics had a greater effect than the number of trained doctors. We find, then, that even the effects of personnel factors vary from state to state. Similarly, the effects of the socioeconomic and structural covariates differ by state, suggesting that the effect of any program input or socioeconomic variable depends largely on the state in which the input is deployed or on the prevailing social conditions.

In India, the implementation of the family planning program is largely the responsibility of state governments, although the financial resources are provided by the central government. The state's organizational efficiency and socioeconomic milieu determine to a large extent the structure and effectiveness of any family planning input. The four states studied here differ widely in terms of the political parties that were in power during the study period—the Marxist Party (for over a decade) in West Bengal, the Dravida Munnettra Kazhagam regional party or its offshoot (for over two decades) in Tamil Nadu, the Congress Party in Maharashtra and the Janata Party in Karnataka. All of these political parties placed different emphases on the family planning program, although all programs were funded by the central government.

Thus, a number of factors—differing political philosophies, levels of organizational efficiency, program input and socioeconomic conditions—become confounded and yield widely varying impressions of program impact. Political and organizational variables have not been taken into account in this analysis; hence, the findings of the study presented here are to be weighed carefully. Nonetheless, several salient observations can be drawn from this analysis regarding the impact of program components on family planning acceptance and implications for future research.

During the past decade, there has been a growing controversy in India among demographers, family planning program administrators and development specialists concerning the impact of increased investment of resources (human, financial or physical) in the family planning program. Criticisms have ranged from the passionate advocacy of a manyfold increase in family planning program resources (to contain population growth once and for all) to the total abolition of such input (on the argument that it is a wasteful expenditure, given its lack of impact so far). On the basis of our results, we believe that the answer lies somewhere in the middle.

The effect of any program input, whether it is related to personnel or facilities, depends essentially on the state in which it is deployed. The state effect seems to be the most dominant factor in determining the impact of each program input. Thus, criticism of the family planning program at the national level seems to be baseless and unjustified. The same program input may be effective in one state and ineffective in another; all program components combined also seem to have a different level of explanatory power in each state. Paradoxically, direct program input seems to have the least explanatory power in Tamil Nadu, where fertility decline has been rapid and the couple protection rate high. Political commitment to the family planning program and to the small-family norm seems to have played the dominant role in family planning acceptance in Tamil Nadu.

Table 7. Unadjusted and adjusted mean acceptance rates of sterilization and of the IUD, by type of analysis and program input, West Bengal

Analysis and program input	Sterilization			IUD		
	No. of PHCs	Unadjusted mean	Adjusted mean	No. of PHCs	Unadjusted mean	Adjusted mean
MULTIPLE CLASSIFICATION ANALYSIS						
No. of MDs						
0	60	4.30	4.97**	58	0.88	1.06**
1	67	5.29	5.28	67	1.23	1.19
2	73	6.24	5.70	73	1.43	1.32
Coefficient		η=.30	β=.11		η=.25	β=.12
No. of paramedics						
0	68	4.29	4.75***	65	0.89	0.93***
1	66	5.08	4.93	67	1.16	1.16
2	66	6.63	6.35	66	1.54	1.50
Coefficient		η=.37	β=.27		η=.30	β=.26
No. of dais						
0	66	4.69	4.95	64	1.04	1.03
1	67	5.16	5.25	67	1.14	1.25
2	67	6.16	5.81	67	1.41	1.31
Coefficient		η=.14	β=.06		η=.18	β=.13
At least one trained MD						
0	152	5.44	5.36	148	1.26	1.21
1	48	5.04	5.27	50	1.04	1.16
Coefficient		η=.06	β=.01		η=.11	β=.03
Adequacy of medical facilities						
0	91	5.88	5.78	89	1.37	1.29
1	109	4.89	4.98	109	1.06	1.12
Coefficient		η=.19	β=.15		η=.18	β=.10
Adequacy of service facilities						
0	65	5.51	5.51	65	1.05	1.05
1	135	5.26	5.26	135	1.27	1.27
Coefficient		η=.04	β=.04		η=.12	β=.12
At least one MD staying in PHC area						
0	189	5.39	5.34	188	1.21	1.21
1	11	4.40	5.26	10	0.92	1.06
Coefficient		η=.08	β=.01		η=.07	β=.04
R2			32.5			32.5
ANALYSIS OF VARIANCE						
R^2			44.0***			48.8***

Our study also reveals that the management of the family planning program in the PHCs has been poor, and that there is little coordination of program components. A number of PHCs have doctors trained in sterilization but do not have operating theater or medical facilities, while a number of PHCs with an operating theater lack an appropriately trained doctor. There may be a deficiency in basic management principles at the PHC level. The absence of management-related variables from the crucial program components considered here not only may have reduced the explanatory capacity of the analysis, but also may have biased its effects. Management variables need greater attention in future analyses.

Family planning program input, in terms of personnel or facilities, may also have become progressively less relevant over the years. If the above analysis had been carried out in the 1960s or 1970s, the same set of factors might have explained a greater amount of the variance.

In the present study, the dependent variables are limited to sterilization and IUD acceptance rates. Since 1985, the Indian program has placed a greater emphasis on spacing methods, and while this change has not yet had a noticeable effect (sterilization continues to be the dominant family planning method), changes may be forthcoming. The impact of personnel and facilities on the use of spacing methods such as the condom and the pill can be expected to differ from their effect on sterilization and IUD use, and such differences need further investigation.

The results of our study seem to indicate that personnel input is more important than facilities, at least in reliance on sterilization or the IUD. Since the motivation work for such methods is done largely by paramedical personnel, and since the paucity of medical facilities in any health center could be compensated for (at least to some extent) by mobile teams of appropriately trained doctors, it is understandable that personnel play a greater role than facilities. This is not to underestimate the need for adequate facilities—operating theaters and other medical facilities—in every PHC to improve the quality of services. However, the scarce resources available should not be spread thinly over all PHCs; they should be centered in areas where they are likely to be most effective because of the availability of trained personnel and other support systems.

References

1. Government of India, *A Brochure of Couple Protection Rates (As of 31st March, 1988)*, Ministry of Health and Family Welfare, New Delhi, 1989, p. 8.

2. M. E. Khan et al., eds., *Performance of Health and Family Welfare Programmes in India*, Himalaya Publishing House, Bombay, 1988.

3. R. J. Lapham and W. P. Mauldin, "Family Planning Program Effort and Birthrate Decline in Developing Countries," *International Family Planning Perspectives*, 10:109, 1984.

4. D. J. Hernandez, *Success or Failure? Family Planning Programs in the Third World*, Greenwood Press, Westport, Conn., 1984.

5. B. D. Mishra et al., *Organizing for Change: A Systems Analysis of Family Planning in Rural India*, Radiant Publishers, New Delhi, 1982.

6. T. V. Antony, K. Srinivasan and P. C. Saxena, "Case Studies of Population Policies and Programmes in India," in G. D. Ness and E. Sattar, eds., *Strategic Management of Population Programmes*, Management Contributions to Population Programmes Series Vol. 7, International Committee on the Management of Population Programmes, Kuala Lumpur, 1989, p. 219.

7. G. D. Ness, "Implementing Strategic Management in Population Programmes: The Search for Strategic Interventions," in G. D. Ness and E. Sattar, 1989, op. cit. (see reference 6), p. 13; and R. M. Maru, "Strategic Management of Population Programmes," in G. D. Ness and E. Sattar, 1989, op. cit. (see reference 6), p. 1.

8. Ibid.

9. A. K. Jain, "Fertility Reduction and the Quality of Family Planning Services," *Studies in Family Planning*, 20:1, 1989.

10. T. V. Antony, K. Srinivasan and P. C. Saxena, 1989, op. cit. (see reference 6).

Resumen

Los datos suministrados por 2.175 centros de atención primaria de la salud ubicados en zonas rurales de cuatro estados de la India revelan que la presencia y los efectos de distintos componentes del programa de planificación familiar difieren muchísimo de un estado a otro. En Maharashtra, por ejemplo, los centros tenían un promedio de 6,5 médicos por cada 100.000 personas, mientras que en Tamil Nadu había menos de tres médicos por cada 100.000 personas; Maharashtra tenía 34 paramédicos por cada 100.000 personas, mientras que en Bengala occidental, Tamil Nadu y Karnataka había sólo de 24 a 28. Dentro de los estados, sin embargo, la mayoría de estos datos varían poco según las condiciones socioeconómicas de los distritos en que están ubicados los centros. Los niveles de aceptación de la esterilización y del DIU en centros que cuentan con personal y equipos adecuados suelen no ser más altos que en los que tienen poco personal y equipo. Además, en varios centros se observa poca coordinación en los tipos de servicios disponibles (como que haya quirófano pero no médico capacitado para utilizarlo). Las características estudiadas explicaban sólo en un 50 por ciento de los casos, y a menudo mucho menos, las diferencias en las tasas de esterilización y aceptación del DIU en estos cuatro estados, lo que indica que hay otros factores (probablemente el apoyo político y la eficiencia administrativa) que influyen más en el éxito de los programas.

Résumé

Les données provenant de 2.175 centres de soins de santé primaires situés dans les zones rurales de quatre états indiens révèlent des différences considérables d'un état à l'autre quant à la présence et aux effets des différents composants du programme de planning familial. Dans l'état du Maharashtra, par exemple, les centres de soins primaires comptaient à leur emploi 6,5 médecins, en moyenne, pour 100.000 habitants tandis qu'il y avait au Tamil Nadu moins de trois médecins pour 100.000 habitants; on trouvait, au Maharashtra, 34 auxiliaires médicaux pour 100.000 habitants par rapport à un nombre variant entre 24 et 28 auxiliaire médicaux pour 100.000 habitants au Bengale occidental, au Tamil Nadu et au Karnataka. A l'intérieur des états, la plupart de ces mesures diffèrent peu suivant les conditions socio-économiques des districts dans lesquels sont situés les centres de soins primaires. Dans bien des cas, les niveaux d'acceptation de la stérilisation et du stérilet ne sont pas plus élevés dans les centres de soins primaires bien dotés en personnel et équipement que dans ceux dont les ressources humaines et matérielles laissent à désirer. En outre, les types de services offerts sont mal coordonnés dans un certain nombre de centres (par exemple, le fait de posséder une salle d'opération sans aucun médecin qui sait l'utiliser). La capacité des attributs étudiés d'expliquer la variance des taux d'acceptation de stérilisation et de stérilet dans ces quatre états ne s'élevait pas à plus de 50 pour cent et souvent à beaucoup moins, ce qui indique que d'autres facteurs (probablement l'appui politique et l'efficacité administrative) contribuent davantage au succès du programme.

Estimating Abortion Levels

(Continued from Page 13)

ciones razonables de la prevalencia de esta práctica. Se propone una metodología para calcular el número de abortos ilegales que se practican, basada principalmente en el número de complicaciones tratadas en los hospitales. Los cálculos del número de abortos inducidos y la proporción entre abortos y nacimientos en el Perú, el Brasil y Colombia indican que por cada 10 mujeres que dan a luz, 3–4 en Colombia y el Brasil y dos en el Perú abortan.

Résumé

Bien que l'avortement soit illégal dans tous les pays d'Amérique latine à l'exception de Cuba, l'avortement provoqué est pratiqué fréquemment dans toute la région. Les planificateurs en matière de santé ont besoin d'estimations raisonnables quant à la fréquence de cette pratique. Une méthodologie est décrite pour estimer le nombre d'avortements illégaux effectués, principalement sur la base du nombre de complications d'avortement traitées dans les hôpitaux. Les estimations du nombre d'avortements provoqués et le rapport entre les avortements et les naissances au Pérou, au Brésil et en Colombie indiquent que, sur 10 femmes donnant naissance, 3–4 en Colombie et au Brésil et deux au Pérou mettent fin à leurs grossesses.

Premarital Sex in Costa Rica: Incidence, Trends and Determinants

> **"The adjusted risk [of premarital sex] is seven times higher for women who are engaged to marry compared with those who are not. Premarital coital activity among Costa Rican teenagers is thus driven in part by marriage at a young age."**

By Luis Rosero-Bixby

Summary

A hazards model using retrospective data from a national sample of Costa Rican women aged 15–24 interviewed in 1986 indicates that every year approximately 10 percent of women aged 17–19—the peak ages for the initiation of premarital sexual activity—become sexually active. The cumulative proportion of women who have had premarital sex by their 20th birthday is 38 percent. The data fail to support the popular belief that premarital sexual activity has increased among younger cohorts: The younger cohorts of women tended to have a lower risk of premarital sexual activity than the older cohorts. Education reduces the risk of premarital sex, whereas being engaged to marry increases this risk sharply. Women in communities with large proportions of consensual unions tend to have an increased likelihood of premarital sex, and the restraining effects of education tend to be weakened.

Introduction

The incidence of premarital sex is probably high in many Latin American countries. It is poorly documented, however, because of the lack of data and the use of inadequate indicators. Nevertheless, high regional levels of adolescent fertility, out-of-wedlock births and consensual unions suggest substantial coital activity before or outside of legal marriage. This article uses a national sample of Costa Rican women to estimate current incidence and recent trends of premarital sexual activity, with the hypothesis that premarital sexual activity is increasing. It also addresses the question of how individual and contextual characteristics determine the likelihood of engaging in premarital sex. Sexual activity within marriage or consensual union, even if it occurs at a young age, is not within the scope of this study. The findings should help direct the efforts of family planning programs and other interventions to prevent pregnancy and sexually transmitted diseases among adolescents.

Two types of forces influence the initiation of coital activity before marriage—the microlevel, or the individual characteristics of an adolescent, and the macrolevel, the social context in which she lives including the marriage norms and sanctions on sex outside of marriage. The microlevel variables in this analysis are the adolescent's level of education and whether she is engaged to marry. The macrolevel variable considered here is the looseness of community social norms regarding marriage, as measured by the prevalence of consensual unions.

Figure 1 (page 26) depicts the model of causal relationships used in the present analysis. To test the hypothesis that premarital sex has recently increased, the model includes two cohort effects—an indirect effect operating through education and engagement to marry, and a direct effect, represented by the arrow connecting the cohort and premarital sex variables.

Educational attainment, as an indicator of socioeconomic status, modernity and alternatives for young women other than dating and marriage, can affect the probability of premarital sex. In Costa Rica, modernity and a high socioeconomic status are thought to be conducive to premarital sexual activity. In addition, education can act indirectly by postponing engagements to marry, the other microlevel determinants in the model. On the other hand, the content of school curricula and the values transmitted by formal education can also influence the initiation of sexual activity by transferring the prevailing sexual and marital values in Costa Rican society, which strongly condemn premarital intercourse.

The contextual variable in the model is thought to be positively associated with premarital sex: Communities with traditionally high levels of consensual unions probably have a high incidence of premarital sex. In addition, the microlevel effects probably change in different contexts. Figure 1 portrays this interactive effect with an arrow from the macro determinant modifying the other three causal links to premarital sex. The model posits no cause-effect relationships between social marital norms and educational attainment or cohort.

An indirect effect of social marital norms working through engagement is also depicted in the diagram: In cultures where the institution of marriage is valued highly, engagements are entered into earlier and last longer, and the risk of premarital intercourse probably increases with the duration of the engagement. Identifying this intervening effect is important because if most, or a substantial part, of premarital sexual activity occurs among engaged couples, then the causal relationship between engagement and early age at marriage would proceed, in theory, from marriage to premarital sex rather than the other way around.

Since young women choose neither the community they live in nor the year they are born, it seems appropriate to treat social marital norms and age-cohort as exogenous variables. Accepting causality between education and premarital sex on the one hand, and engagement and pre-

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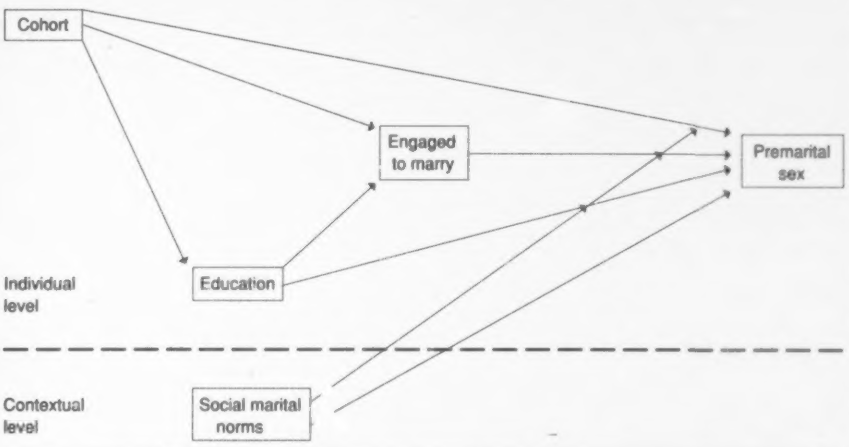
Figure 1. Causal model depicting the determinants of the initiation of premarital sex, Costa Rica, 1986



marital sex on the other, assumes the former variables precede the latter. The required time sequence was assured by making education and engagement time-dependent variables; that is, they were computed at the beginning of each month of exposure.

Data and Methods

Measurement of the incidence of premarital sex can be difficult. An indicator frequently used in the literature is the proportion of women who have ever had premarital intercourse.[1] This proportion can be misleading because it actually measures both the risk (per unit of time) of initiating sexual activity before marriage and the length of exposure to the risk. With all other factors held constant, the proportion who have ever had premarital sex should increase with age and with older age at marriage because of the increased duration of exposure. In other words, the date of the survey interview truncates the exposure in younger women while marriage truncates the exposure in women who married earlier than the date of interview. Measures of the risk of premarital sexual activity should be independent of these two censoring effects, particularly when the risks between populations or across time are being compared. Life-table methods, also called hazards models, can efficiently handle these types of censoring effects and effectively incorporate time-varying covariates as well.[2]

This article describes the results of a proportional hazards model, or Cox's model, that simultaneously examines the effects of several variables on the risk of premarital sex. The major assumption of Cox's model is that the relative risk is constant at each duration or age, which is not to say that the risk itself is constant over time. Actually, the risk, or hazard, can be any function of time, as long as this function is the same in all individuals or groups. Moreover, the assumption of a constant relative risk over time is not a crucial feature of the model because the hazards cease to be proportional as soon as time-dependent explanatory variables are introduced.[3] Cox's model compares hazards of individuals with identical ages or durations to estimate relative risks and thus it implicitly controls for the effect of different age structures.

The analysis utilizes data from the 1986 Fertility and Health Survey, a nationally representative survey conducted by the Costa Rican Demographic Association in collaboration with the U.S. Centers for Disease Control.[4] The survey asked 1,379 women from 15 to 24 years of age whether and when they had first had premarital intercourse. This figure shrank to 1,358 women after incomplete or inconsistent observations were excluded. Consensual unions were considered in the analysis as marriages. Subjects were grouped into three age-cohorts according to the year of the woman's 15th birthday—1976–1979, 1980–1982 and 1983–1985; these three age-cohorts correspond to women who were approximately aged 21–24, 18–20 and 15–17, respectively, at the date of the interview. The number of years of education completed at each month of the young woman's life, starting at age 12, was estimated by combining information on the years of education and age at the time of the interview, using Costa Rican standards of correspondence between age and educational level.

The dichotomous, time-dependent variable "engaged or not" was defined month by month. Since the survey did not ask the date of engagement, this date was set at three months before the legal marriage; women who were single or in consensual unions were considered to have never been engaged. The major limitation of these assumptions is that the periods of engagement not resulting in legal marriages are missed.[*]

The contextual variable "looseness of marriage norms," was measured by the proportion of couples in consensual union in each canton (or county), which was obtained by the 1973 census. The use of these relatively old data was deliberate, since the analysis considers the social context of the woman's childhood rather than that of

Table 1. Among women aged 15–24 in 1986, estimated number of woman-years of exposure to the risk of premarital sex, annual rate of initiation of premarital sex and cumulative probability (and standard errors), by age, Costa Rica, 1986

Age	Woman-years of exposure	Annual rate	Cumulative probability
12	1,354.0	0.7 (0.2)	na
13	1,339.0	1.7 (0.4)	0.7 (0.2)
14	1,292.5	3.2 (0.5)	2.3 (0.4)
15	1,161.0	5.8 (0.7)	5.4 (0.6)
16	949.0	5.5 (0.7)	10.7 (0.9)
17	738.5	9.4 (1.2)	15.5 (1.0)
18	532.0	9.8 (1.4)	23.4 (1.3)
19	372.5	11.4 (1.8)	30.6 (1.5)
20	244.0	8.2 (1.8)	38.0 (1.8)
21	156.5	5.9 (1.9)	42.9 (1.9)
22	86.5	8.4 (3.2)	46.2 (2.1)
23	37.0	5.5 (4.0)	50.5 (2.5)
24	9.5	na	53.2 (3.0)

Note: na=not applicable. Source: Data tape from the *Encuesta Nacional de Fecundidad y Salud, Costa Rica, 1986*, Asociación Demográfica Costarricense.

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[*] This classification error may bias the true effect of the exposure either upwards or downwards. The bias, however, is acceptable if the effect of engagement is substantial and the amount of time that adolescents spend engaged is short. Let's assume, for example, that 10 percent of the years from ages 12–19 is spent in engagement; only half of the engagement period is correctly classified by the definition of three months before marriage; and the relative risk of premarital sex is 8.0 for the five percent exposure period that has been correctly classified. If the relative risk for the misclassified exposure were identical to the correctly classified period, the observed relative risk would be 5.8 compared with an actual value of 8.0. If, by contrast, the relative risk for the misclassified exposure were only 2.0, the observed relative risk would be 7.6, compared with a true value of 5.0. These two examples represent extreme situations and, therefore, the error is probably in the range of plus-or-minus three points, for a true relative risk ranging between 5.0 and 8.0.

her current situation. The 1986 survey questionnaire asked about the respondent's main residence only during the five years preceding the survey. Less than 15 percent of women probably moved before this five year period and thus the great majority spent most of their childhood in the canton recorded in the survey. The proportion in consensual union, as well as years of education, were included as continuous variables in the model.

A separate life-table estimated the risk of premarital sex by age. Cox's models with time-dependent covariates were used to estimate the proposed micro and macro effects.* The "survival" or "failure" time variable for these analyses—that is, the length of time between the beginning of the observation and the target event—was counted in months, starting at age 12. Censoring occurred at marriage (or entry into a consensual union) or three months before the interview, whichever came first. The BMDP statistical software package was used to compute the results.[5]

Results

How common is premarital sex in Costa Rica? Twenty-eight percent of women aged 15–24 stated that they had had premarital intercourse. This percentage, though indicative of considerable sexual activity before marriage, is a crude measure because it is affected by the censoring effects previously pointed out. Table 1 presents the more meaningful life-table analysis and shows that the annual rate, or risk, of initiating premarital sexual activity reaches a peak at ages 17 to 19. At its highest value, the risk is 9–11 percent per year. The rate of initiation of premarital intercourse is lower before age 17: The risks are one percent at age 12 and six percent at ages 15–16. The life-table suggests a decline in the risk after age 19, but the estimates are too imprecise (the standard errors are large) to draw definitive conclusions.

The last column in Table 1 shows the proportion of unmarried women who have had sex before the specified age. This cumulative probability of having premarital sex increases monotonically with age. Twenty-three percent of young women have engaged in premarital sex before their 18th birthday, and 38 percent by their 20th birthday, a proportion that rises to 53 percent at age 24.

To what extent is premarital sex associated with each of the other variables? As expected, the crude percentage that have had premarital sex is higher among the older cohorts: Among those aged 21–24 at the time of the survey, 40 percent have had premarital sex, compared with 34 percent of those in the middle cohort (ages 18–20 at the interview) and 20 percent of those in the youngest cohort (ages 15–17 at the interview). The association between age-cohort and premarital sex is substantial, but it cannot be concluded that the likelihood of premarital sex is declining in younger cohorts; the association is undoubtedly an artifact of the truncated exposure among the younger cohorts.

Table 2. Among cohorts of 15–24-year-old women, annual rates of initiation of premarital sex (and standard errors), by age; and cumulative probability by 18th birthday

Age	Cohort*		
	1976–1979 (N=490)	1980–1982 (N=420)	1983–1985 (N=448)
12	0.4 (0.2)	0.5 (0.4)	1.1(0.5)
13	1.7 (0.6)	2.2 (0.7)	1.1 (0.5)
14	2.4 (0.7)	4.6 (1.1)	2.9 (0.8)
15	6.0 (1.2)	7.1 (1.4)	4.0 (1.1)
16	5.5 (1.1)	6.6 (1.4)	3.7 (1.4)
17	10.8 (1.8)	9.5 (1.8)	6.0 (3.0)
18	10.4 (1.9)	9.3 (2.0)	†
19	10.7 (2.0)	12.7 (3.4)	†
20	6.9 (1.8)	†	†
Cumulative probability by 18th birthday	23.5 (2.0)	26.2 (2.2)	17.1 (3.0)

*Cohort defined by year of the respondent's 15th birthday.

†Less than 100 exposed individuals.

Marital status and the probability of premarital sex appear to be strongly related. Among ever-married women, 53 percent had had premarital sex, compared with 13 percent among single women. Once again, uncontrolled exposure to risk is a problem: Single women are probably younger and thus have been exposed for a shorter period of time, and married women have a censored exposure because of their marriage. It is not clear whether the higher percentage of premarital sex among married women is attributable to an increased risk of premarital sex during engagements, some other factor associated with not having sex while single, or more openness among married women in reporting premarital sex.

A clear negative association also exists between education and premarital sex. The proportion of college-educated women who have had premarital sex is half that of women with only an elementary school education (17 percent vs. 34 percent). In addition, 25 percent of those who had a secondary school education had initiated sexual activity before marriage. However, since younger age at interview and earlier age at marriage (shorter exposure) are associated with less education, censoring effects once again influence the comparison. Moreover, given that the measure of education corresponds to the time of the interview rather than to the period of exposure, one may argue that the association is spurious or even that low educational level is a consequence rather than a cause of premarital sexual activity; that is, early sexual activity may lead to dropping out of school.

The results indicate a positive association between a tradition of consensual unions in the community and the likelihood of premarital sex. In cantons where less than 10 percent of couples were in a consensual union in 1973, 24 percent of the women surveyed in 1986 had had premarital intercourse. The corresponding proportions of those who initiated premarital sex in cantons with 10–19 percent and ≥20 percent of couples in consensual unions were 28 percent and 40 percent, respectively. However, this association could be affected by the tendency toward lower educational attainment and early marriage in communities with high proportions of consensual unions.

The associations examined so far, although they suggest that levels of premarital sex are affected by early marriage, education and social norms, are hardly conclusive. The proportion of women who have had premarital sex is biased by differences in the length of exposure time or by censoring effects. A discrete life-table analysis is a straightforward approach to controlling for the censoring effects. Table 2 compares the life-table, age-specific rates of premarital sexual activity among different age-cohorts. Women in the 1980–1982 cohort have slightly higher rates of sexual initiation than the 1976–1979 cohort, except at ages 17 and 18. Women in the youngest cohort (1983–1985) have lower rates than either of the older cohorts except at age 12. However, the large standard errors of these annual rates prevent

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*William Mason distinguishes between two approaches of estimating macro effects in multilevel analyses—the fixed-effect approach, which assumes no disturbances to the macro effects and the stochastic-parameter approach, which assumes the existence of macro disturbances independent of micro errors. Since the currently available software used to estimate Cox's models allows for only one type of disturbance, the estimates in the present article use the fixed-effect approach. In the empirical example presented by Mason to compare the two approaches for logistic regression, the results were virtually identical. (See W. M. Mason, "Addendum to Manual IX: The Methodology of Measuring the Impact of Family Planning Programmes on Fertility," *Population Studies*, No. 66, United Nations, 1986, pp. 24–31).

Table 3. Among 15–24-year-old women, crude and adjusted relative risk of initiating premarital sex (and 95 percent confidence intervals), by variable

Variable	Relative risk	
	Crude	Adjusted
Cohort*		
1975–1979	1.00 reference	1.00 reference
1980–1982	1.13 (0.91–1.42)	1.12 (0.90–1.41)
1983–1985	0.75 (0.54–1.06)	0.77 (0.55–1.08)
1983–1985†	0.67 (0.47–0.95)	0.68 (0.47–0.99)
6 additional years of education	0.33 (0.26–0.43)	0.39 (0.30–0.51)
Engaged to marry	8.12 (5.84–11.3)	6.90 (4.96–9.61)
Additional 10% of couples in consensual unions	1.28 (1.19–1.37)	1.23 (1.15–1.32)
Global chi-square		324.48 (p=0.000)

*Cohort defined by year of the respondent's 15th birthday.

†Calculated with the 1980–1982 cohort as the reference group.

drawing conclusions about the existence of trends. The cumulative probability of having had premarital sex by age 18 for the 1976–1979, 1980–1982 and 1983–1985 cohorts is 24 percent, 26 percent and 17 percent, respectively. Although the slight increase between the two older cohorts is not statistically significant, the decline for the youngest cohort is. If there is a trend, then it is toward declining rates of premarital sexual activity among younger women.

The use of Cox's model conveniently summarizes comparisons of age-specific rates from discrete life-tables. The model also facilitates multivariate analyses, which are severely limited by the sample size in discrete life-tables, and considers the lifetime variations in conditions such as education and engagement status. Table 3 presents two series of relative risks estimated with Cox's model, namely "crude" and "adjusted," for the four explanatory variables under study. The crude relative risks describe bivariate associations estimated with separate hazards models for each explanatory variable. The adjusted relative risks, which show the net or direct effect of each variable on the rate of premarital sex, come from a multivariate model that includes all the explanatory variables.

The differences between the crude and adjusted relative risks, if any, indicate the importance of indirect and shared effects.* The fact that the differences are trivial suggests that the indirect effects are minor, and it is not necessary to study the two series separately. Therefore, the analysis focuses on the adjusted series of relative risks only.

The relative risks by cohort confirm the results from the discrete life-table analysis and refute the popular perception that sexual activity among young people has recently increased. The adjusted risk of initiating intercourse before marriage is 12 percent higher among the 1980–1982 cohort than among the 1976–1979 cohort, but this slightly elevated risk is not statistically significant. Young women in the 1983–1985 cohort are 23 percent less likely to initiate premarital sexual activity than those in the 1976-1979 cohort but a full 32 percent less likely to do so than those in the 1980–1982 cohort, a statistically significant difference.

The preventive effect of education on early premarital sex is clear from the results of the proportional hazards model in Table 3. Holding all other variables constant, each six additional years of education reduces the risk of initiating coital activity before marriage by 61 percent. As expected, the period of engagement is particularly risky for the initiation of coital activity. The adjusted risk is seven times higher for women who are engaged to marry compared with those who are not. Premarital coital activity among Costa Rican teenagers is thus driven in part by marriage at a young age.

The results in Table 3 of the effect of the proportion of consensual unions in the community are consistent with the hypothesis that premarital sex is partly determined by contextual, or macro, characteristics. Young women who live in cantons that presumably have loose social norms of marriage, as indicated by traditionally high proportions of consensual unions, are more likely to initiate coital activity before marriage or entry into a union. For each 10 percentage points in the proportion of all unions in the canton that are consensual, the risk of premarital sex increases by 23 percent, net of the effect of the other explanatory variables. In the extreme case of cantons where, for example, half of all couples are in consensual unions, this risk would be three times higher than in cantons where legal marriage is universal (i.e., 1.23 to the power of five, yielding a relative risk of 2.8).

Table 4. Among 15–24-year-old women, adjusted relative risk of initiating premarital sex (and 95 percent confidence intervals), by the percentage of consensual unions in the community, according to variable

Variable	Consensual unions	
	<20% (N=1,042)	≥20% (N=316)
Cohort*		
1976–1979	1.00 reference	1.00 reference
1980–1982	1.03 (0.79–1.36)	1.28 (0.86–1.89)
1983–1985	0.63 (0.41–0.98)	1.05 (0.61–1.81)
1983–1985†	0.61 (0.38–0.97)	0.82 (0.46–1.45)
6 additional years of education	0.33 (0.24–0.45)	0.51 (0.32–0.82)
Engaged to marry	9.01 (6.29–12.9)	2.80 (1.96–6.96)
Global chi-square	304.79 (p=0.000)	15.43 (p=0.004)

*Cohort defined by year of the respondent's 15th birthday.

†Calculated with the 1980–1982 cohort as the reference group.

With the existence of a contextual effect confirmed, the final step in the analysis is to determine if the contextual variable also influences the microlevel effects. Table 4 compares the microlevel effects on the initiation of premarital sex among cantons with a low prevalence of consensual unions and those with a high prevalence.† The table shows that the proposed moderator effect of the social context indeed exists. The decline in premarital sexual activity among the 1983–1985 cohort occurs only in contexts where consensual unions are rare. Moreover, the microlevel effects of education and engagement are substantially reduced—although they are still significant—in cantons where consensual unions are common. In these cantons, each six additional years of education reduces the risk of initiating premarital sex by 49 percent, and during periods of engagement, the risk increases nearly threefold (relative risk of 2.8). By contrast, in cantons with low proportions of consensual unions, each six additional years of education reduces the risk of premarital sex by 67 percent, and being engaged increases this risk by a factor of nine.

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*The table also shows two pieces of information for statistical inference—the 95 percent confidence interval for the estimated relative risks, and the global chi-square with their probabilities. Confidence intervals whose range includes the value of 1.0 indicate statistically nonsignificant effects. The global chi-square statistic, and its p-value, test the hypothesis that all regression coefficients are identically zero, which is a way of testing the fit of the model as a whole.

†The chi-square test was used to evaluate the statistical significance of the two-term interactions between the contextual variable and each of the individual variables. All two-term interactions implicit in Table 4 were statistically significant at p=.05.

Conclusions

The evidence from the analysis confirms that the incidence of premarital sex in Costa Rica is high. At the peak ages of 17–19, the annual risk of initiating premarital sexual activity is about 10 percent; the cumulative proportion who have had premarital sex by age 20 is 38 percent. However, the data refute the popular belief that the incidence of premarital sex has increased among younger cohorts: Women in the youngest cohort—those who turned 15 in 1983–1985—have lower risks of initiating premarital sex than women in the two older cohorts. Although this difference is statistically significant, it is probably premature to conclude that a downward trend has started. The youngest cohort was observed only until their 18th birthday, and the trend may reverse itself after that age. The apparent decline may also reflect less openness among younger respondents in reporting premarital sexual experience.

The results of the analysis confirm the proposed microlevel effects of education and engagement: Increased education reduces the risk of premarital sex, and this risk rises sharply during periods of engagement. The results also confirm the macrolevel influence of the prevailing marriage norms, as well as the interaction of this variable with the microlevel variables: In cantons with loose marriage norms, the likelihood of premarital sex is high, and the microlevel effects of education are weakened.

The analysis demonstrates the critical role of education and social context. It also suggests that the relationship between early marriage and premarital sex is more complex than it appears. It would be misleading to speak of premarital sex as the cause and early marriage as the effect. In some circumstances the contrary is true: Premarital intercourse is often considered less of a sin once a formal engagement has been entered into and much of the premarital sexual activity in Latin America probably takes place during this period of engagement. Adolescent women initiate sexual activity at a young age because they engage to marry at a young age. As a policy implication, the results of the analysis indicate the importance of targeting prevention programs in adolescent pregnancy and sexually transmitted diseases to single adolescents with low educational attainment and to those living in communities with traditionally high proportions of consensual unions.

References

1. L. Morris, "Young Adults in Latin America and the Caribbean: Their Sexual Experience and Contraceptive Use," *International Family Planning Perspectives*, **14**:153, 1988.

2. P. D. Allison, *Event History Analysis: Regression for Longitudinal Event Data*, Sage Publications, Beverly Hills, Calif., 1984.

3. Ibid.

4. Data tape from the *Encuesta Nacional de Fecundidad y Salud, Costa Rica, 1986*, Asociación Demográfica Costarricense; and M. W. Oberle et al., "Contraceptive Use and Fertility in Costa Rica, 1986," *International Family Planning Perspectives*, **14**:103, 1988.

5. W. J. Dixon, ed., *BMDP Statistical Software*, University of California Press, Berkeley, Calif., 1985.

Resumen

Según un modelo de riesgo en que se utilizaron datos retrospectivos de una muestra nacional de mujeres costarricenses de entre 15 y 24 años entrevistadas en 1986, cada año aproximadamente el 10 por ciento de las mujeres de entre 17 y 19 años—la edad más proclive a la iniciación sexual prematrimonial—comienzan su vida sexual activa. La proporción acumulada de mujeres que han tenido relaciones sexuales antes del matrimonio a los 20 años es del 38 por ciento. Estos datos no corroboran la creencia popular de que la actividad sexual antes del matrimonio ha aumentado entre las cohortes más jóvenes, pues las de menor edad tendieron a registrar menos riesgo de actividad sexual prematrimonial que las cohortes mayores. La educación reduce el riesgo de sexo prematrimonial, mientras que estar comprometida para casarse lo aumenta marcadamente. En las comunidades con grandes porcentajes de uniones consensuales la probabilidad de sexo prematrimonial es mayor, tendiendo a atenuarse los efectos restrictivos de la educación.

Résumé

Un modèle de risques ayant recours à des données rétrospectives provenant d'un échantillon national de Costa-riciennes âgées de 15 à 24 ans, interviewées en 1986, indique que, chaque année, environ 10 pour cent des femmes âgées de 17 à 19 ans (âges auxquels débutent principalement les activités sexuelles prémaritales), deviennent sexuellement actives. La proportion cumulative de femmes ayant eu des rapports sexuels prémaritaux avant leur 20ème anniversaire de naissance est de 38 pour cent. Les données ne confirment pas la croyance populaire suivant laquelle les rapports sexuels prémaritaux ont augmenté parmi les cohortes plus jeunes: règle générale, le risque d'activités sexuelles prémaritales était plus bas chez les cohortes de femmes les plus jeunes par rapport aux cohortes de femmes plus âgées. L'instruction réduit le risque d'activités sexuelles prémaritales, ce même risque étant de beaucoup accru chez les fiancées. Dans les communautés où les unions consensuelles sont répandues, les femmes sont généralement plus susceptibles d'avoir des rapports sexuels prémaritaux, et l'instruction tende à avoir un effet moins fort.

DIGEST

Trinidad and Tobago: Users of Reversible Methods Prefer Pill or Condoms over Hormonal Injectables

The pill is the most popular method among women in Trinidad and Tobago. However, although most women who have practiced contraception have used oral contraceptives, only about one-fourth of current users are doing so. The condom, used by just over one-fifth of current contraceptive users, is the next most popular method. Female sterilization, used by 16 percent of current users, is the most popular method among those aged 35–49. Injectables are not popular among women in Trinidad and Tobago; the vast majority of women who try them do not continue using them. These are some of the highlights of a 1990 follow-up analysis of data from the 1987 Trinidad and Tobago Demographic and Health Survey (DHS).[1]

Trinidad and Tobago is a republic made up of two main islands and several smaller islands in the Caribbean. About 80 percent of the population is of Indian or African ethnicity, in approximately equal proportions. The republic's Family Planning Association provides a variety of contraceptives at little or no cost.

Contraceptive Use

In the 1987 DHS, 63 percent of all respondents aged 15–49 and 82 percent of those ever in a union* said they had practiced contraception at some point in the past. Those aged 25–29 are most likely to have ever used contraceptives (86 percent), while those aged 15–19 and 45–49 are least likely to have used them (69 percent and 73 percent, respectively). Although there is some variation in ever-use according to education, residence, ethnicity, current union status and religion, the majority of women in all the subgroups have used contraceptives.

Sixty-seven percent of women who have ever practiced contraception have tried the pill, 58 percent have used the condom and 36 percent withdrawal. The pill is the method most likely to have been tried by ever-users between ages 20 and 49. Women 15–19, however, are more likely to have used withdrawal or the condom (58 percent and 53 percent, respectively) than the pill (42 percent). About 10 percent of ever-users are protected by female sterilization; in general, the proportion sterilized increases with age, with almost one-quarter of women 45–49 having undergone sterilization.

The pill is the most popular method among ever-users in each educational, residential and ethnic subgroup. The popularity of other methods varies somewhat, however: Rural women and women with a primary education or less are more likely than their urban and more educated counterparts to have been sterilized and are less likely to have ever used periodic abstinence. Urban women are more likely than rural women to have ever used the IUD. In addition, a greater proportion of non-Indian than Indian women have ever used the IUD, periodic abstinence and vaginal methods.

In the 1987 DHS, 53 percent of women currently in a union reported that they were practicing contraception at that time. Patterns of current use according to subgroup are, in general, similar to those of ever-use. However, while non-Indians are more likely than Indians to have ever practiced contraception (87 percent vs. 76 percent), they are less likely to currently be doing so (50 percent vs. 57 percent). Similarly, ever-use is greater among Roman Catholics (85 percent) than among Hindus or other non-Christians (79 percent and 83 percent, respectively), but current use is greater among Hindus and other non-Christians (about 57 percent of each group) than among Catholics (54 percent).

Among current users aged 15–34, the pill is the most commonly used method (ranging from 24 percent to 41 percent). Among older women, however, female sterilization is the most popular method: More than one-quarter of women aged 35–39 and over half of those aged 45–49 are sterilized. Female sterilization is, overall, the third most popular method among current users (16 percent), following oral contraceptives (26 percent) and the condom (22 percent).

Thirty percent of current users aged 15–19 use withdrawal or periodic abstinence. The author of the report finds this proportion "appallingly high" in light of the accessibility of more effective methods. She also suggests that the 1987 finding that there is a high degree of knowledge about contraceptives in this age-group (94 percent had general knowledge and 93 percent knew about modern methods) "should be suspect."

The pill is not favored by all subgroups of current users as overwhelmingly as by ever-users. For instance, rural women are about as likely to use the condom (25 percent) as the pill (24 percent). In addition, legally married women and Hindu women are more likely to use the condom (27 percent and 28 percent, respectively) than they are to use the pill (21 percent and 24 percent, respectively).

The 1987 DHS asked all women who were not currently practicing contraception if they intended do so in the future. Of the 2,384 who were not using contraceptives at the time of the survey, 35 percent said they intended to use them in the future. Women aged 15–34 are more likely than those aged 35–49 to intend future use (34–51 percent vs. 3–22 percent). In addition, women with a secondary or greater education are more likely than those with a primary or less education to intend to practice contraception in the future (42 percent vs. 26 percent). Intentions do not vary much according to residence, ethnicity or religion.

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*Women are said to be "in a union" if they are legally married and living together, in a common-law union (i.e., living with a sexual partner) or in a visiting union (i.e., having regular sexual relations with one partner). All data given here on ever-use or current use of contraceptives are for women ever in a union or currently in a union, respectively.

Of those who say they intend to use contraceptives in the future, nearly 25 percent are not sure what method they will choose, while almost 40 percent plan to use the pill. Among women 35 and older, sterilization is slightly preferred to the pill. Seventy percent of the women intend to use a modern method, and only six percent think they will use a traditional method.

Discontinuation of Use

In the 1987 survey, women were asked what methods they had used since their last live birth, as well as what methods they had used between any live births they had had during the previous five years. The investigators recorded only the last two methods the women reported using. The resulting data yielded information on discontinuation rates and method-switching.

Overall, 55 percent of women were using a method at some time and then stopped; these women were no more likely to have switched to a new method than to have discontinued contraceptive use altogether (27 percent vs. 28 percent). For all contraceptives except the condom and the pill, the majority of users are more likely than not to have stopped using the method at some point in the past. Women who discontinued pill use are more likely to have stopped practicing contraception altogether than to have switched to another method (26 percent vs. 23 percent). Condom users, however, are more likely to have tried another method than to have ceased contraceptive use completely (30 percent vs. 18 percent). The overwhelming majority of women who tried injectables did not keep using them: Almost 90 percent of women who used injectables stopped using them, with 62 percent switching to another method and 26 percent ceasing contraceptive use altogether.

The likelihood of discontinuation does not vary a great deal by age, education, residence or ethnicity. The only large difference in the proportion switching methods and the proportion ceasing use is among women in a visiting union: Forty-nine percent of women in such unions began using another contraceptive after discontinuing use of an earlier method, while just 20 percent stopped practicing contraception.

Respondents to the 1987 DHS who said they had stopped using a method during the intervals specified were given a list of possible reasons why and were asked to choose their primary motivation for discontinuing use. Women who had had at least two births in the previous five years were most likely to cite the desire to become pregnant as their major reason for discontinuing use between the last two births. Users of all methods except the IUD and injectables were most likely to say that their primary reason was wanting to become pregnant; users of the IUD and injectables were most likely to cite health concerns.

Trends in Use

Although data from a 1970–1971 knowledge, attitudes and practice-type survey and from the 1977 Trinidad and Tobago Fertility Survey are not strictly comparable with the 1987 DHS, the author identified some broad trends. Between 1970–1971 and 1977, ever-use of contraceptives increased substantially among women 20–44 years of age; however, between 1977 and 1987, there was no change in ever-use among women in this age-group. Among women 25–29 and 30–34, ever-use actually declined slightly in the latter interval.

Current use of modern methods increased somewhat between 1977 and 1987 among women 35–44 and 45–49, but decreased among those 25–34. Current use of the pill decreased among all three age-groups, while current use of the IUD increased in all age-groups. Reliance on female sterilization also increased among all women, but did so most dramatically among those aged 45–49.—*P. Rind*

Reference

1. N. Abdulah, *Selection, Change, and Discontinuation of Contraceptive Methods in Trinidad and Tobago*, Demographic and Health Surveys Further Analysis Series, No. 4, Institute for Resource Development/Macro Systems, Inc., Columbia, Md., Mar. 1990.

Weekly Testosterone Injections Suppress Sperm Production, May Provide Effective Contraception

Weekly injections of testosterone enanthate suppressed sperm production in a large group of fertile men, and provided contraceptive efficacy at a rate comparable to that of female injectable contraceptives and better than that of the IUD, the pill or the condom.[1] A 10-center study conducted by the World Health Organization (WHO) also showed that recovery from sperm suppression was easily achieved, and that side effects from the injections were minimal. However, discontinuation rates were high, and were related mostly to the treatment's inability to completely suppress sperm production.

The WHO study subjects were 271 healthy, fertile men between ages 21 and 45 recruited from 10 study centers around the world.* To be eligible for the study, subjects had to be in stable relationships with healthy partners no older than 35 years old and to have normal sperm with a count of more than 20 million per milliliter. The mean age among study participants was 29 years; 228 (84 percent) of the men had established fertility with their partners, for a median of two completed pregnancies per participant.

The study was divided into three phases—suppression, efficacy and recovery. Throughout the study, subjects were given weekly 200 mg injections of testosterone enanthate. Semen samples were collected once a month for the first two months, and then once every two weeks during the remainder of the suppression phase. Two months into the suppression phase, any couple using a hormonal method was required to switch to a barrier method. This phase ended when the man stopped producing sperm—in other words, became azoospermic—at which point he and his partner ceased all other contraceptive use. The efficacy phase then began, and continued until an individual subject stopped receiving injections (which could be up to a year after the first injection). At that point, the subject entered the recovery phase, during which he was monitored for his return to normal spermatogenesis.

Fifty-eight percent of the men participating in the study (157 in all) ceased sperm production during the suppression phase; their mean time from the first injection to azoospermia was 120 days. Seventy-five percent of these men (119) completed the efficacy phase. Thus, 114 men (42 percent) left the study during the suppression phase and 38 (14 percent) left during the efficacy phase. More than half of those who left during the suppression phase did so because they did not achieve sufficient sperm suppression; this was a 23 percent life-table discontinuation rate within six months of beginning injections. However, the six-month life-table rate for becoming azoospermic was almost 65 percent; 70 percent of those who completed the suppression phase were able to completely cease sperm production. There were no variations in age, height, weight or other baseline characteristics between those who successfully completed suppression and those who did not. There was some variation between centers, however: The Chinese centers had a mean azoospermia rate of 91 percent, compared with 60 percent in the other centers.

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*Men enrolled in the study were from one center each in France, Finland, the United States, Scotland and Sweden, from two centers in Australia and from three centers in China.

After the injections began, subjects who became azoospermic, as well as those who did not, experienced a four percent increase in mean body weight; a six percent increase in mean hemoglobin level and a 142 percent increase in mean testosterone level. Among all subjects, there was also a six percent decrease in mean testicular volume, an eight percent decrease in mean plasma urea level, a decrease in mean luteinizing hormone level of 67 percent, and a decrease in follicle-stimulating hormone level of eight percent. All of these values returned to normal baseline levels during the recovery phase.

Eight men stopped receiving injections during the suppression phase because their partners became pregnant. (Participants had agreed to use other forms of contraception during this phase, but it is not known how well they complied with this regulation.) One pregnancy occurred during the 1,486 months of the efficacy phase, a pregnancy rate of 0.8 per 100 person-years. Sperm were found in only 21 semen samples (from 11 men) out of 1,515 samples taken during the efficacy phase; of these men, none discontinued the study, nor did any of their partners become pregnant.

Two men were released from the study during the efficacy phase because they did not satisfy the original admission criteria, and 15 men (an annual cumulative life-table discontinuation rate of about eight percent) left during the suppression and efficacy phases because of the following difficulties with the injections: Dosages were too frequent (five subjects), too painful (six subjects), caused infection at the injection site (one subject) or were not given within the prescribed time interval (three subjects). A total of 52 men left during the suppression and efficacy stages for medical or personal reasons (annual rates of 12 percent and 13 percent, respectively): Nine reported acne; three reported increased aggressiveness or libido; two each left because of raised packed cell volume and hemoglobin, weight gain, and abnormal lipids; and one each because of hypertension, depression, fatigue, aphthosis, acute prostatitis, pneumonia, and Gilbert's syndrome. Three left the study because of their partners' medical problems.

At the time of the study report, recovery information was available for 230 subjects (85 percent of the original sample). In 192 men (84 percent), sperm concentration had surpassed the study baseline of 20 million per ml, and in 106 (46 percent) it had returned to their own baseline level. The median time needed to return to 20 million per ml was 3.7 months among those who had reached azoospermia, 3.0 months among those who had not and 3.9 months among those who had discontinued the study for other reasons. The participants needed somewhat longer to return to their own baseline sperm concentration—6.7 months, 5.7 months and 9.0 months, respectively. During the recovery period, there were 11 conceptions, of which two resulted in induced abortion, one in spontaneous abortion, four in normal live births and the remainder in continuing pregnancies. Two men left so that their partners could conceive; the women became pregnant during the recovery phase.

The failure rate of the testosterone injections in this study was comparable with the first-year failure rates of women's injectable contraceptives (0.2–0.4 per 100 person-years of protection), and better than that of oral contraceptives (three per 100 person-years) and IUDs (six per 100 person-years).[2] Furthermore, the efficacy rate is significantly better than that of the condom (12 per 100 person-years of protection), the only other reversible male contraceptive.

The investigators emphasize that the aim of the study was to determine if the laboratory diagnosis of azoospermia corresponded to high contraceptive efficacy, not to promote testosterone enanthate as a hormonal method. Apart from its inability to induce complete azoospermia in many men, the frequency of the injections would be inconvenient for the general population, and would create difficulties in dispensing the method. However, the researchers point out that the WHO and other groups have been investigating longer-acting testosterone formulations that might allow for 3–4 month intervals between injections.—*R. Turner*

Reference

1. World Health Organisation Task Force on Methods for the Regulation of Male Fertility, "Contraceptive Efficacy of Testosterone-Induced Azoospermia in Normal Men," *Lancet*, **II**:955, 1990.

2. J. Trussell and K. Kost, "Contraceptive Failure in the United States: A Critical Review of the Literature," *Studies in Family Planning*, **18**:237, 1987.

Three in Four Jamaican Pregnancies Are Either Mistimed or Unwanted

Fertility in Jamaica has declined sharply over the past 15 years, and the use of effective methods of contraception has risen substantially, according to the findings of the 1989 Jamaica Contraceptive Prevalence Survey (CPS).[1] Nevertheless, 55 percent of the women who were pregnant at the time of the survey said their pregnancy was mistimed, and 20 percent said it was unwanted. Women are starting childbearing at younger ages, but want smaller families than do women in earlier generations. Almost all women have heard of AIDS, but misconceptions about how the disease is transmitted are widespread, and few women consider themselves to be at risk.

Jamaica, a Caribbean island located south of Cuba and west of Haiti, attained independence from Great Britain in 1962. Its population in 1988 was estimated at 2.4 million; about one-third of these people live in major urban areas. In 1989, fewer than half of one percent of women aged 15–49 had no education, 36 percent had some primary schooling, 51 percent had some secondary education and eight percent had some postsecondary education. Women are attaining higher levels of education than in the past: Among 15–19-year-olds, 74 percent had some secondary education and 20 percent had some primary education; the corresponding proportions among 45–49-year-olds were nine percent and 80 percent.

Marriage and Fertility

The 1989 Jamaica CPS was conducted among 6,112 women aged 15–49. It is the most recent in a series of fertility surveys, including the 1975 Jamaica Fertility Survey (JFS), three earlier Contraceptive Prevalence Surveys (in 1974, 1979 and 1983) and the 1987 Young Adult Reproductive Health Survey. Of the women who were interviewed, 17 percent were legally married, 23 percent were in a common-law relationship, 28 percent were in a visiting union, 12 percent had previously been in a union and 20 percent had never been in a union. In 1989, the median age at first union was 16.8 years; 16 percent of the respondents had entered a union before age 15, and 63 percent had done so before age 20. Although there was little difference between rural women and urban women in the median age at marriage, women with a postsecondary education were a year and one-half older at first marriage than those with a primary education (18.3 years vs. 16.8 years).

In Jamaican society, young men and women tend to enter more stable, formal relationships as they grow older. In 1989, only five percent of women aged 20–24 were legally married, compared with 42 percent of those aged 45–49. Conversely, 43 percent of the 20–24-year-olds were in visiting relationships, compared with 11 percent of the 45–49-year-olds. These proportions did not vary substantially according to rural or urban residence. Only nine percent of the women who were legally married at the time of the survey had been married to their partner from the beginning of their union; 73 percent had initially had a visiting relationship and 19 percent had had a common-law union. Among those who were in common-law marriages at the time of the survey, 87 percent had initially had a visiting relationship with their partner.

The average desired family size has decreased over time: Women aged 45–49 at the time of the survey considered three children ideal, while those aged 15–19 wanted only two children. There was no difference between rural women and urban women or between women at different educational levels in the number of children desired.

Comparison with data from earlier surveys shows that levels of fertility in Jamaica have fallen during the past 15 years. The total fertility rate (TFR) in 1989 was 2.9 lifetime births per woman, compared with 3.5 in 1983 and 4.5 in 1975. The mean number of children ever born to women aged 45–49 also decreased during that period, from 5.3 in 1975 to 4.8 in 1989; on average, rural women had more children than did urban women (5.1 vs. 4.3). Childbearing seems to be starting at younger ages: The mean age at first birth among women aged 45–49 was 23.9 years, compared with 19.5 years among those aged 25–29.

At the time of the survey, the mothers of substantial proportions of the infants born in the preceding 24 months were still breastfeeding (52 percent), amenorrheic (21 percent) or practicing postpartum abstinence (29 percent); as a result, the mothers of 37 percent of the infants were not exposed to the risk of pregnancy. Both the prevalence and the duration of breastfeeding have increased during the last 15 years. Of the infants born in the 24 months prior to the survey, 96 percent were breastfed, compared with 94 percent in 1975. The mean duration of breastfeeding increased by 50 percent between 1975 and 1989 (from eight months to 12 months). There were slight differences in postpartum insusceptibility by education and area of residence, reflecting longer-than-average durations of breastfeeding and postpartum abstinence among women with a primary education and those in rural areas. -

Contraceptive Knowledge and Use

Almost all of the survey respondents knew of at least one effective method of birth control, with little variation by urban or rural residence, age or level of education. The pill and the condom were the most widely known methods (99 percent each), followed by injectables (96 percent), female sterilization (92 percent) and the IUD (83 percent). The proportions of women who knew about the pill, the condom, injectables and female sterilization varied little by educational level, but knowledge about other methods rose steeply with educational level.

Seventy-one percent of Jamaican women have used a contraceptive at some time, with little difference between rural areas and urban areas or between types of union. The median age at first use was 19 years. Women with a secondary education were less likely to have used a method than were women in the other educational groups (67 percent vs. 74–77 percent). Almost half of the respondents who had ever used a method had used the pill (48 percent), and smaller proportions had relied on condoms (33 percent), injectables (23 percent) or female sterilization (11 percent).

In 1989, 55 percent of women currently in a union were using a contraceptive, compared with 51 percent in 1983 and 38 percent in 1975. The largest proportion were using the pill (20 percent), followed by female sterilization (14 percent), the condom (nine percent) and injectables (eight percent). In 1975, those proportions were 12 percent, eight percent, seven percent and six percent, respectively. At the time of the survey, contraceptive prevalence was slightly higher among rural women than among urban women (56 percent vs. 52 percent), but the method mix for each group was similar to the overall pattern.

Contraceptive use was higher among women in legal marriages than among those in common-law marriages or visiting relationships (60 percent vs. 52 percent and 54 percent). Method mix also varied by type of relationship: Female sterilization was the most common method among legally married women (29 percent), followed by the pill (11 percent), the condom (seven percent) and injectables (five percent); among women in common-law marriages, on the other hand, the pill was the preferred method (21 percent), followed by female sterilization (12 percent), injectables (nine percent) and condoms (seven percent). Women who had a visiting partner relied primarily on the pill (24 percent), condoms (11 percent) and injectables (nine percent), and less on female sterilization (six percent).

Both contraceptive prevalence and method mix varied considerably by age. Contraceptive prevalence rose steadily from 48 percent of 15–19-year-olds to 59 percent of 35–39-year-olds, and then declined among older women. Pill use was most common among women aged 20–29 (27 percent) and then decreased steadily with age, while reliance on female sterilization rose sharply among women older than 30, peaking at 37 percent among 40–44-year-olds. Condom use, on the other hand, declined from 17 percent among women aged 15–19 to one percent among those aged 45–49. Use of injectables, like use of the pill, peaked among 20–29-year-olds (10 percent) and declined among older women.

There were considerable differences in both overall prevalence and method mix by level of education. Women with a postsecondary education were more likely to be using a method (61 percent) than were those with a secondary or primary education (55 percent and 52 percent, respectively). Women with a primary education were most likely to rely on female sterilization (21 percent) or the pill (14 percent), while those with a secondary education were more likely to use the pill (24 percent) or condoms (10 percent); among women with a postsecondary education, the pill was the most commonly used method (20 percent), followed by female sterilization (12 percent) and the condom (11 percent).

In 1989, 64 percent of the women in a union who were not using a method gave

DIGEST

reasons related to pregnancy, infertility or lack of sexual activity. Spousal opposition was cited as a factor by fewer than one percent of the respondents. Of those who had used a method in the past, but were not doing so at the time of the survey, about half cited health problems or side effects (29 percent and 23 percent, respectively).

According to CPS data, 16 percent of Jamaican women aged 15–49 were in need of family planning services in 1989.* Despite this relatively low level of unmet need, only 29 percent of all births in the five years before the survey were planned, while 52 percent were mistimed and 18 percent were unwanted. The proportion of planned births was higher among women in urban areas (31 percent) and women with a postsecondary education (50 percent).

About seven percent of women currently in union were pregnant at the time of the survey; of these women, 23 percent said their pregnancy was planned, 55 said it was mistimed and 20 percent said it was unwanted. Again, the proportion of planned pregnancies was higher among urban women than among rural women, and women with a postsecondary education were considerably more likely to have planned their pregnancy than were those with a secondary or primary education. Moreover, women aged 25–29 were twice as likely as those aged 15–19 to have planned their pregnancy (32 percent vs. 16 percent). This may reflect, in part, the disparity between median age at first intercourse (17 years) and median age at first contraceptive use (19 years).

Maternal and Child Health

Among children born in the five years preceding the survey, 98 percent were born to mothers who received prenatal care. The mothers of 65 percent received tetanus shots, and the mothers of 22 percent were inoculated against rubella. During that period, 77 percent of all births took place in a hospital, 20 percent at the mother's home and two percent in a private nursing home or rural maternity center. Women who were young, those who lived in urban areas and those who had a postsecondary education were more likely to give birth in hospitals than those who were older, lived in rural areas and had a primary education. More than 90 percent of births were attended by a doctor or trained nurse-midwife.

In 1989, virtually all of the survey respondents had heard of AIDS; the proportion did not vary according to residence in urban or rural areas, age or union status. Of these women, most knew that the human immunodeficiency virus could be transmitted by heterosexual intercourse (99 percent), intercourse between men (98 percent), receiving a blood transfusion (83 percent) or sharing needles used for drugs (77 percent). However, substantial proportions believed they could become infected by giving blood (59 percent) or being bitten by an insect (35 percent). Moreover, 73 percent believed they were at little or no risk of becoming infected.—*F. Althaus*

Reference

1. C. McFarlane and C. Warren, *1989 Jamaica Contraceptive Prevalence Survey, Final Report*, National Family Planning Board, Kingston, Jamaica, 1990.

Poor Health Care Leads To African Women's High Rates of Uterine Rupture

The incidence of uterine rupture during labor may be higher in some African countries than anywhere else in the world. A large study at a Nigerian referral hospital found that six out of every 1,000 women giving birth developed a ruptured uterus;[1] a somewhat smaller study in Guinea/Conakry found an incidence of nearly nine per 1,000 deliveries.[2] Although only a small proportion of the women died as a result of uterine rupture, the complication was often fatal for the newborn infant: Between three-fifths and three-quarters died as a result of the rupture. Lack of prenatal care and poor health care delivery services seem to be the major factors contributing to this problem.

Uterine rupture is a severe complication of pregnancy and a major cause of maternal morbidity and mortality in developing countries, particularly where prenatal and obstetric care are unavailable to or underused by large numbers of women. Researchers at the University College Hospital in Ibadan, Nigeria, retrospectively studied the incidence of uterine rupture at that hospital during the 12-year period from January 1975 to December 1986, and examined related factors and maternal and infant outcome. (It should be noted that because women with serious problems are more likely to be referred to a teaching hospital, problem cases may have been overrepresented in the study population.)

During the period studied, there were 37,313 deliveries, with 227 cases of ruptured uterus (6.1 per 1,000). (This is far higher than the rates of 0.7 per 1,000 deliveries and 0.09 per 1,000 deliveries reported in the United States and Canada, respectively; Uganda has the highest known incidence—10 per 1,000 deliveries.) The rate of ruptured uterus in Ibadan varied widely from year to year, from 3.5 per 1,000 in 1981 to 9.9 per 1,000 in 1986. Seventeen (7.5 percent) of the women diagnosed with a ruptured uterus died, and many more experienced any of a variety of associated complications; only 37 percent had no related complications. Sixty-two percent of infants born to mothers with ruptured uterus died at or around the time of birth.

Prenatal care was strongly associated with the risk of uterine rupture: While 80 percent of the total obstetric population had received prenatal care, only 29 percent of those with a ruptured uterus had done so. In addition, women in their 30s were at greater risk than younger women: Women 30 and older made up just 31 percent of the obstetric population, but constituted 57 percent of those who developed a ruptured uterus.

Women who had had a prior cesarean delivery were at greater risk of uterine rupture than those who had never had one: Only 14 percent of the total obstetric population had had a previous cesarean delivery, compared with 48 percent of those with a ruptured uterus. The use of oxytocin to augment labor was not related to the risk of uterine rupture

The researchers believe that the high incidence of uterine rupture in the country is primarily a result of poor delivery of health care services. They note that a recent increase in the number of obstetricians in Nigeria has had no effect on the incidence of uterine rupture, and point to "the declining economic status of individuals, the increasing cost of medical care and the dependence on 'spiritual therapy'" as possible explanations. They suggest education, legislation and increased funding of safe health care as appropriate measures to deal with the problem. Of particular importance to the researchers is improved education, because although managing high-risk labor in a hospital setting would go a long way toward preventing many cases of ruptured uterus, most Nigerians do not readily accept the idea of delivering outside of the home.

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*Defined as women who are not pregnant, do not desire a pregnancy and are not using a contraceptive method for reasons unrelated to pregnancy, subfecundity or sexual inactivity.

Another group of researchers looked at the incidence of uterine rupture and related factors at the Donka University Hospital in Conakry/Guinea. From January 1985 to December 1986, there were 9,535 births at that hospital, of which 81 (8.5 per 1,000) involved a ruptured uterus. Seventeen (21 percent) of the women and 61 (75 percent) of the infants died.

In this study, parity was associated with the incidence of ruptured uterus: Women with five or more lifetime births constituted 22 percent of the total obstetric population, but made up 44 percent of those with a ruptured uterus.

These investigators, like those who conducted the Ibadan study, contend that a major factor in the high incidence of uterine rupture in their country is the desire of women to attempt delivery at home. Compounding that problem are the deficiencies found in many developing countries—"inadequate prenatal care, lack of surgical equipment and qualified staff, [and] grand multiparity. . . . "—*P. Rind*

Reference

1. J. C. Konje, O. A. Odukoya and O. A. Ladipo, "Ruptured Uterus in Ibadan—A Twelve Year Review," *International Journal of Gynecology and Obstetrics*, 32:207, 1990.

2. M. D. Balde, G. P Breitbach and G. Bastert, "Uterine Rupture—An Analysis of 81 Cases in Conakry/Guinea," *International Journal of Gynecology and Obstetrics*, 32:223, 1990.

Contraceptive Practice Doubles in Nigerian City Over a Five-Year Period

Contraceptive use among married women aged 15–35 doubled in Ilorin, Nigeria, in just five years, according to the results of two surveys carried out in 1983 and 1988.[1] The largest relative increase in ever-use occurred among the least educated women, and the great majority of these women—88 percent—used a contraceptive method for the first time in the four years before the 1988 survey. Overall, there was a shift toward the use of more effective methods over the period between the surveys. The considerable increase in method use appears to reflect the abrupt decline in Nigeria's oil-based economy and the resulting changes in fertility desires and in population policy and programs.

The two surveys conducted among residents of Ilorin, the capital of Nigeria's Kwara state, followed the same basic sampling design. Because recent Nigerian census data allowing a representative sample do not exist, sufficient numbers of women in each education group in Ilorin had to be drawn from areas of low, medium and high socioeconomic status. The 1983 survey (conducted between September 1983 and January 1984) covered 913 married women aged 15–35. The later survey (conducted from September 1988 to December 1988) was extended to include those aged 36–49 and the husbands of all women surveyed, but for comparability, the analysis described here considers only the responses of 818 married women aged 15–35. While both surveys asked about contraceptive knowledge as well as about current use and ever-use, only the later survey asked women when and how they first heard about contraceptives, and when and where they obtained them.

There were slight variations between the surveys in the proportions sampled from each area of the city: In 1983, the proportions living in the areas of low, medium and high socioeconomic development were 38 percent, 29 percent and 33 percent, respectively; in 1988, the comparable proportions were 31 percent, 41 percent and 28 percent. Although the percentage of women with a primary education was identical in each of the surveys (28 percent), the percentage with no education decreased from 42 percent in 1983 to 30 percent in 1988, and the percentage with at least a secondary education increased from 30 percent to 42 percent.

By 1988, knowledge of any contraceptive method was nearly universal among Ilorin women; it was lowest among the least educated and those living in the poorest area, 90 percent of whom had heard of a method. The increase in knowledge of the most effective methods (the pill, the IUD, injectables and sterilization) was particularly dramatic. For example, among women with no education and those living in the poorest neighborhood, the proportion knowing of at least one effective method increased by 62–63 percentage points between the surveys.

In general, a large proportion of Ilorin women had acquired their contraceptive knowledge very recently. Roughly two-thirds of women with no education or only primary schooling, half of those with a secondary education and one-third of those with more than secondary schooling had heard about family planning for the first time in the four years before the survey. Only among the most educated had a sizable proportion of women (32 percent) known about family planning for 10 years or longer. Although most of the respondents had found out about family planning through the mass media, a majority of the least educated women (62 percent) and of those living in the poorest neighborhoods (71 percent) first learned about family planning from a doctor or nurse.

The proportion of women in each of the four education categories who were currently using a contraceptive method increased substantially between surveys. For example, in the five-year period, current contraceptive use increased from one percent to five percent among the least educated, from four percent to 15 percent among those with a primary education, from 11 percent to 20 percent among those with a secondary education and from 22 percent to 40 percent among the most educated. By area of residence, the largest relative gain in current use (from 11 percent to 30 percent) occurred among women living in the most developed area of Ilorin.

Over the five years between surveys, there was also a shift toward the use of more effective methods. In 1983, 60 percent of women in the sample were using a more effective method; by 1988, that figure had risen to 74 percent. Consequently, the use of the less effective modern methods (the condom, the diaphragm, and foam or jelly) declined from 24 percent to 11 percent, while reliance on the least effective methods (rhythm, withdrawal and other) changed little (14–16 percent).

Finally, the results of the 1988 survey indicate that the majority of women in each education and residence category started contraceptive use very recently. For instance, 88 percent of women with no education, 71 percent of those with primary schooling, 67 percent of those with secondary schooling and 57 percent of those with more than secondary schooling used a method for the first time in the four years preceding the survey. Similarly, the proportions within areas of residence, from lowest to highest socioeconomic development, ranged from 88 percent to 61 percent. The great majority of Ilorin residents (83–96 percent) obtained their method from either a hospital or a clinic.

The researchers assert that contraceptive knowledge is now nearly universal in Ilorin, Nigeria, even among the poorest and least educated women. Moreover, although absolute levels of method use are still lowest among the most disadvantaged women, current contraceptive use increased substantially in the period between surveys among all education and residence subgroups. According to the investigators, these sharp increases could reflect the efforts to promote family planning made by the Nigerian government, the mass media and medical personnel after the collapse of the country's oil-based economy in 1983, and the increased demand for family planning among couples that also may have resulted from the economic crisis.

However, it is not clear whether the rise in contraceptive use corresponds to an increased demand for contraceptives to space births or to limit them. Furthermore, the researchers warn that some of the effects of increased contraceptive use could be cancelled out by the continuing erosion of traditional breastfeeding practices and postpartum abstinence in urban Nigeria. They point out that more extensive analyses of quantitative data from the 1988 survey are forthcoming—including data on changes in proximate determinants, fertility desires and the attitudes and behavior of men. The researchers conclude that "although it is still too early to announce the start of widespread fertility reduction in Africa, the progress of family planning programs in Nigeria . . . warrants close attention."—*L. Remez*

Reference

1. G. A. Oni and J. McCarthy, "Contraceptive Knowledge and Practices in Ilorin, Nigeria: 1983–88," *Studies in Family Planning*, **21**:104, 1990.

Rhythm Accounts for Half Of All Contraceptive Use In Bolivia, DHS Reveals

Bolivian women can expect to have five children during their childbearing years; fertility is higher in Bolivia than in Latin America overall and modern methods of contraception are rarely used. Although a slight fertility decline appears to have occurred among younger Bolivian women, it has been confined almost exclusively to urban areas and to educated women. Less than one-third of married Bolivian women use any contraceptive method, and reliance on traditional methods—especially rhythm, which accounts for half of all use—is far more common than is use of modern methods. These are some of the main findings of the Encuesta Nacional de Demografía y Salud (ENDSA),[1] which surveyed 7,923 Bolivian women aged 15–49 between March and July of 1989.

The Andean nation of Bolivia, situated in the center of the South American continent, is one of the least densely populated countries in Latin America. The population is unevenly distributed, however, with 20 percent living in Los Llanos, an area in the northern central region that accounts for 65 percent of Bolivia's territory. The remaining population is almost equally divided between the Altiplano (the western part of the country, which contains the capital, La Paz) and Los Valles (the central region). The indigenous Indian population is concentrated in the Altiplano (the highlands) and Los Valles, regions that are primarily rural. However, a large part of the Los Llanos region is urban and is influenced by modernizing trends from neighboring Brazil. As of 1988, Bolivia had an estimated six and one-half million people, of which just one-quarter live in cities of 200,000 or more inhabitants.

Considerable gains in educational attainment are apparent from the characteristics of the ENDSA sample: While nearly one-half (48 percent) of women aged 45–49 had never been to school, just four percent of young women aged 15–19 had had no schooling. Educational gains are strongly concentrated in urban areas, however, with 46 percent of urban women, but only seven percent of rural women, having completed at least nine years of schooling. Overall, according to ENDSA data, 18 percent of Bolivian women are currently illiterate, 36 percent have had 1–5 years of schooling, 16 percent have had 6–8 years and 31 percent have completed at least nine years.

Marriage and Fertility

Marriage is nearly universal in Bolivia; just four percent of women in the sample had not married by the end of their reproductive years. More than 60 percent were in a union at the time of the survey,* and the proportion of those over age 30 who were in a union exceeded 80 percent. Table 1 presents some selected findings from the 1989 Bolivian ENDSA. According to the survey results, the median age at first union has not changed in recent years, remaining constant at age 20. While there is little difference in age at marriage according to urban or rural residence, women living in Los Llanos tend to marry earlier (at about age 19) than do those living in the other two regions (at about age 21).

Bolivian women tend to begin childbearing at a relatively young age: Half of the sample had their first child before age 21. Moreover, the ENDSA data on age at first birth (calculated for women age 25–49) indicate a consistent trend in recent years toward an even earlier age at first birth. Among women aged 45–49 at the time of the survey, the median age at first birth was 22 years, compared with age 21 among women currently 25–29. Age at first birth varies considerably by region and by level of educational attainment; the most educated women, for instance, have their first baby two and one-half years later than all other women. In addition, the median age at first birth is lower in Los Llanos (20) than in the Altiplano and Los Valles (over 21 years in both).

By the end of their childbearing years, Bolivian women can expect to have nearly five births; this total fertility rate (TFR) is substantially higher than the average of 3.7 lifetime births per woman across all of Latin America. Bolivian women aged 40–49 have had 5.6 lifetime births; given that this rate is higher than the country's current TFR, there is an indication that fertility has started to decline slightly. However, downward trends are confined primarily to urban areas: According to the ENDSA data, rural women can expect to have over two children more than urban women (6.4 vs. 4.0 lifetime births). Although the data show regional differences in fertility as well, these are much less pronounced than the observed educational variations. For example, at current rates, women with no education will have three more lifetime births than those who have had at least nine or more years of school (6.1 vs. 2.9).

Knowledge and Use of Contraceptives

Roughly three-quarters of the ENDSA sample have heard of at least one contraceptive method, and over 90 percent of these women know where to obtain one. The best-known methods among women in union are periodic abstinence, the IUD, the pill and female sterilization (known by 52–55 percent). The next most commonly recognized methods are injectables (43 percent), the condom (29 percent) and withdrawal (27 percent), while just 16 percent of the overall sample have ever heard of vasectomy. As expected, knowledge levels are highest in urban areas (82 percent) and in the region of Los Llanos (93 percent).

Thirty-three percent of the ENDSA sample have ever used a contraceptive method, although that proportion rises to 46 percent when only married women are considered. Periodic abstinence is not only the best-known method, but is also the most widely used: Thirty-one percent of married women have ever practiced periodic abstinence.

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*Both legal and consensual unions were considered as marriages in the Bolivian ENDSA.

The ENDSA findings indicate that 30 percent of Bolivian women in union were practicing contraception at the time of the survey, with 18 percent using traditional methods and 12 percent using modern methods.* Over half of all current use is accounted for by periodic abstinence, which 16 percent of married women say they were using at the time of the interview. Even though periodic abstinence is the most popular method among all age-groups, the highest proportion relying on it (85 percent) can be found among the youngest women (15–19-year-olds). Two-thirds of women relying on periodic abstinence can correctly identify the most fertile period in the menstrual cycle, although less than one-third of *all* respondents know when a woman is most likely to conceive.

After periodic abstinence, the next most popular methods currently used are the IUD (five percent), female sterilization (four percent), the pill (two percent) and withdrawal (one percent). Less than one percent of Bolivian women are using injectables, the condom or the diaphragm, and very few women have a partner who is vasectomized.

Contraceptive prevalence and methods used vary considerably with urban or rural residence, region, education and parity. For example, 40 percent of urban women are using a contraceptive method, compared with 19 percent of rural women. The overall level of use is highest in the region of Los Llanos (43 percent), with more than one-quarter using modern contraceptive methods. Although a relatively high proportion of the highly educated women use the IUD (13 percent), the most popular method in this group, as in all other groups, is periodic abstinence (26 percent). The data also indicate that women may be starting contraceptive use at younger ages and at lower parities: Twice as many 20–35-year-olds as 35–44-year-olds began practicing contraception after the birth of their first child (20 percent vs. 10 percent).

The most frequently cited source of methods (other than the condom) is a private doctor's office. Furthermore, the only method for which the public sector is an important provider is female sterilization: Fifty-four percent of Bolivian women who choose sterilization have their operation in a government hospital.

Table 1. Selected findings from the 1989 Bolivian Encuesta Nacional de Demografía y Salud

Measure	Median, % or rate
Median age at marriage (in yrs.)*	20.3
Median age at first birth (in yrs.)*	21.0
TFR (lifetime births per woman)	4.9
% of married women knowing at least one contraceptive method	75.0
% of married women currently using any contraceptive method	30.3
% of married women currently using a modern method	12.2
% of married women who want no more children†	72.3
% of married women with a potential need for family planning	58.4

*Based on women aged 25–49.

†Includes users of sterilization.

To ascertain why the majority of married women in Bolivia do not practice contraception, the 1989 ENDSA asked respondents how they would feel if they became pregnant in the next few weeks. Twenty-four percent said they would be happy, 53 percent said they would be unhappy and six percent claimed they were indifferent. The main reasons why women who would not welcome a pregnancy do not practice contraception are their lack of knowledge about methods and their religious objections to contraception. Of the 80 percent of nonusers in the last interval between births who had children in the five years before the survey, 21 percent said the births were mistimed and 27 percent said they were unwanted. Furthermore, 57 percent of women currently not practicing contraception have no intention of using a method in the future, while 34 percent of nonusers do intend to do so and eight percent are undecided. Among those who expect to start, the methods they said they would most likely use are periodic abstinence (25 percent) and the IUD (22 percent).

Married women not protected by sterilization were asked during the interview whether they wanted any more children. Two-thirds said they did not, a high proportion that varies little by region or by rural or urban residence. The proportion who want no more children increases sharply with parity, rising from 31 percent among women with one child to 66 percent among those with two children, and reaching 83 percent among those with six or more. Including women who have been sterilized increases the proportion of married women who want no more children to three-fourths.

The ENDSA data reveal that 58 percent of married Bolivian women are potentially in need of family planning services because they are fecund, not using any contraceptive method and want no more children or want to wait at least two years before having another. Forty-nine percent want to limit births and 10 percent want to space them. Potential need for family planning is highest among illiterate women (72 percent), rural women (68 percent) and those living in the Altiplano (63 percent).

On average, Bolivian women consider a family of three children to be ideal. Although this ideal is fairly stable across subgroups of women, it varies according to region, with women in the Altiplano saying they would like two children, while those in Los Valles and Los Llanos want three. As a further examination of ideal fertility levels, the wanted fertility rate was calculated for the 1989 ENDSA. With all unwanted fertility excluded, the TFR drops to 3.2 lifetime births per woman, and this decline holds across all subgroups.

Maternal and Child Health

Rates of infant and child mortality—95 deaths per 1,000 infants and 142 deaths per 1,000 children under age five—are higher in Bolivia than in any other Latin American nation that has participated in the DHS program to date. The largest differentials are between the infants of the best educated and least educated women (46 per 1,000 live births and 124 per 1,000, respectively). The intervals between births also exert an important influence on mortality: Babies born less than two years after a previous birth are twice as likely to die as those born after an interval of 2–3 years (154 infant deaths per 1,000 live births vs. 77 per 1,000 live births).

According to the 1989 ENDSA, more than half of the women who gave birth in the five years preceding the survey received no prenatal care. Receipt of prenatal care varies markedly according to educational attainment and urban or rural residence. For example, although 88 percent of the best educated women receive prenatal care, the comparable proportion among uneducated women is only 19 percent. Further, only one-fifth of Bolivian mothers receive a tetanus toxoid vaccination to prevent neonatal tetanus, a major contributor to neonatal mortality in the developing world.—*L. Remez*

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*Included as modern methods were the pill, the IUD, injectables, vaginal barrier methods (the diaphragm and foam), the condom and male and female sterilization. Rhythm, withdrawal and "others" were included as traditional methods.

Reference

1. República de Bolivia, Ministerio de Planeamiento y Coordinación, *Encuesta Nacional de Demografía y Salud, 1989,* Instituto Nacional de Estadística and Institute for Resource Development/Macro Systems, Inc., Columbia, Md., 1990.

Books in Review

Two Views of Childbearing in India

The Causes of Demographic Change: Experimental Research in South India
by John C. Caldwell, P. H. Reddy and Pat Caldwell, The University of Wisconsin Press, Madison, 1988, $37.50 hardbound, $19.95 paperbound, 285 pp.

Labour Pains and Labour Power: Women and Childbearing in India
by Patricia Jeffery, Roger Jeffery and Andrew Lyon, Zed Books Ltd., London, 1989, $15.00 paperbound, 292 pp.

Reviewed by Leela Visaria

These two studies, published within a year of each other, have many parallels. Both are based on anthropological research in rural India, both are products of teamwork, in which the primary responsibilities were shouldered by non-Indians and Indian students and researchers acted as assistants, and the field work in both cases was conducted in the early 1980s. However, the settings of the two studies are different: Jeffery and colleagues conducted their research in two villages of Uttar Pradesh state in northern India; Caldwell and colleagues worked in nine villages of Karnataka state in southern India.

The two studies address many of the same issues. The Jeffery book analyzes women's childbearing experiences in the context of the domestic and class politics of northern India. Using verbatim responses, they examine the way in which various aspects of childbirth—including the child's sex and birth order and the structure and class position of the household it is born to—have different implications for the mothers in the study region. Caldwell and his colleagues are concerned with the nature and causes of demographic change, including determinants of fertility such as education, marriage, contraception, family structure, health care and mortality. The authors unravel many of the underlying processes and meanings through a combination of in-depth interviews and a demographic survey.

The two books are somewhat different in their arrangement of material and style of writing. Each chapter of the Caldwell book is more or less self-contained; all the chapters were written separately and published in various books and journals between 1982 and 1986. The first chapter provides an overview of and a link to the rest of the chapters, along with an elaboration of the focus of the study and methodologies used. In contrast, the text of *Labour Pains and Labour Power* is in the classic anthropological tradition, quoting many of the informants' responses verbatim. Both studies provide useful insights into regions that warrant close watching.

The two communities observed are experiencing similar social, economic and demographic changes, some of which are occurring throughout India. In the Jeffery book, the authors contend that the effects of many of these changes are not necessarily favorable to women in agrarian northern Indian society, but Caldwell and coauthors express guarded optimism by suggesting that in rural southern India, changing family relationships have given greater voice to women in decisions that were once solely the domain of the family patriarch. Comparing these studies might help readers understand the persistent regional diversity of India and explain how changes that enhance the status of women in one region can have the opposite effect in another.

The drought-prone southern region studied by Caldwell and his colleagues has experienced several changes that have influenced traditional power struggles, both on the family and community level and between generations and genders. These changes include a reduction in the average size of landholding; a decline in overall mortality (especially in infant and child mortality, resulting in more children surviving to adulthood); an increase in the availability of local off-farm and urban employment; and the expansion of education, particularly for women, because of educated-men's demand for educated wives.

In this changed environment, childbearing is viewed differently. Prolonged schooling of both boys and girls imposes economic strains on families. The expansion of health services, including contraceptive facilities provided by the state, has helped couples accept contraceptive use and limit their family size. Parents have increasingly ceded to young couples the right to control their fertility within marriage, and education has given women more say in fertility decisions (even though major decisions, such as sterilization, are still not made without the permission of the husband's parents).

The area studied by Jeffery and her colleagues in the north has also experienced fragmentation of land due to population increase. Like most of the regions around the river Ganges, this study area has experienced a "green revolution." Reliable water supplies and new seeds have helped peasants to maintain two or three crops a year and have provided more seasonal work for those without land. Consequently, farm workers have not felt as much pressure to seek employment in nearby towns as have residents of the south. With the increased agricultural productivity, the economic conditions of most households have improved.

At the same time, however, the workloads of women in land- and cattle-owning households in the north have risen. Furthermore, women are excluded not only from property ownership, but from the world beyond their immediate households. Education among women is not

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seen as necessary: Even in the 1980s, virtually every daughter-in-law in the study area was illiterate and very few young women attended school. Childbearing women appear to have little say in matters relating to fertility control; husbands say they make all of these decisions, and they are unwilling to concede that their parents play any role. However, women say that in the patriarchal family structure, their in-laws continue to play a strong role in family planning decisions.

Both studies report similar demographic changes at the household level, yet even these changes have different implications for the women in each region. In both the northern and southern regions studied, women's age at marriage has increased in recent years, although the initial levels were different. Delayed marriage has not, however, led to smaller family size. In fact, rise in age at marriage has led to a decrease in the time interval between marriage and cohabitation in the north and between cohabitation and first pregnancy in both regions. Overall, young women experience their first pregnancy at approximately the same age as their mothers did.

Caldwell and coauthors state that men's age at marriage in southern India has not increased as much as women's, and that, therefore, the age gap between spouses has narrowed; this has led to marriages based on companionship. Researchers in the Jeffery study did not inquire about the age at marriage among men in the north, and therefore they do not provide the corresponding information for their study region. However, macrolevel data from the Uttar Pradesh censuses suggest that although the age gap between spouses has always been smaller there than in the south, the rise over time in mean age at marriage of men has meant that the age gap between spouses has been maintained. In any event, an unequal relation between spouses does persist in the north, and men continue to make most of the decisions for at least several years after marriage.

The studies also show that in both southern and northern India, young couples seem to be living in nuclear family arrangements sooner after marriage than did the older generations; in some regions, this has given women some freedom from the influence and control of in-laws. The taboos on postpartum intercourse in both study areas are not as firmly adhered to as they were in the past, largely because of resistance by young men. The duration of breastfeeding has also declined by up to six months in both regions, although in the northern villages, mothers continue to breastfeed their children well into the next pregnancy. All these changes seem to raise the frequency of sexual intercourse and have a positive effect on fertility.

Caldwell and his colleagues report on a number of changes in the southern region, including a rise in both the use of the dowry system and the amount paid for dowries; a decline in marriage between relatives; an increase in the average age of brides; and an increased level of education. There has been a change in the internal relationships within the family as well, leaving matters relating to fertility control to the couples themselves. By contrast, in the northern region, setting up a nuclear household does not free a woman from her husband's authority; she tends to lose whatever help her female in-laws may give her in an emergency, and once she is separated from her native village, she loses the support of her own kin.

Regarding this latter factor, the studies show an important difference between the two societies in the practice of visiting natal homes. Even in the 1980s, pregnant women in the north did not ordinarily visit their home village to deliver any of their children, as they do in the south. This is true across social classes and among both Hindus and Muslims. Pregnancy is a demonstration of women's sexuality and is therefore considered shameful, so women are expected to distance themselves from their families at this time. In addition, husbands and their relatives offer virtually no help during labor, which renders their wives even more isolated. In southern India, however, women's contacts with their parental kin are frequent; they go to their natal villages not only for their first delivery, but for subsequent ones if possible. Natal kin continue to be a source of at least moral support for women long after their marriage.

Why are women in the north unable to profit from economic, demographic and social changes, while similar changes actually enhance women's status in the south? Jeffery and coauthors suggest that the lack of access to productive resources or property along with the prevailing systems of kinship, residence and marriage have put women in the north in a disadvantageous position. While this thesis is clear in the context of gender and class allegiances, it must be conceded that there is very little differentiation among women belonging to different class categories. In addition, changes that cut across class divisions have not shaken the hold of patriarchy, which has strong roots in the caste system in northern India. Property or employment will not enhance the status of women unless there are drastic changes in the patriarchal structure and in the increasingly pervasive norms and mores of the ruling upper castes. In the south, the population belonging to the high castes has been numerically small, and the large middle-range caste groups have shown greater readiness to adapt to changes. This might explain the emerging social flexibility in that region.

In the Caldwell book, there is much unnecessary repetition in several chapters, especially about the sources of data and the research approach; this could have been avoided with better editing of the material. Secondly, although the authors have used and analyzed data collected in a demographic survey, they have refrained from presenting most of the data in a tabular form. Instead, table reading is done in the text, which is a bit jarring. The text of the Jeffery volume flows smoothly.

Although they are based on microstudies, these two books have raised larger issues pertaining to changing Indian social structure, responses to change at the household level, and the coping mechanisms of various household members. Yet the books also go beyond previous work by Western scholars on the differences between northern and southern India by pointing out specific factors relating to women's status. They make significant contributions to our understanding of the disparities observed between the two societies and will be valuable not only to demographers but to all social scientists. Both books will also be useful to students interested in microstudies, and guide them in interpreting and analyzing observational data in a larger societal context.

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International Family Planning Perspectives

Contraceptive Failure in Developing Countries

Making Vasectomy More Accessible
Family Planning [illegible]
Impact of Aids on Condom's Image in Mexico

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Table of Contents

		Page
Update		42

Articles

Contraceptive Failure Rates In Developing Countries: Evidence from the Demographic And Health Surveys	Lorenzo Moreno and Noreen Goldman	44
Family Planning Knowledge, Attitudes And Practices of Males in Ilorin, Nigeria	Gbolahan A. Oni and James McCarthy	50
Making Vasectomy Services More Acceptable to Men	Ricardo Vernon, Gabriel Ojeda and Ana Vega	55
The Impact of AIDS on Knowledge And Attitudes About Condoms as a Contraceptive Method in Urban Mexico	John Stover and Mario Bravo	61

Comment

Fertility Decline and Pronatalist Policy in Singapore	Sharon M. Lee, Gabriel Alvarez and J. John Palen	65

Books in Review

People vs. the Environment	Jodi L. Jacobson	70
An Updated Text: The Figo Manual	Ramiro Molina Cartes	7[illegible]

Digest

Family Planning Programs Reduce Developing-World Populations	74
China's Fertility Patterns Closely Parallel Recent National Policy Changes	75
Burmese Total Fertility Rate Remained Stable Between 1973 and 1983	76
Better Access to Health Services in Nicaragua Lowered Infant Mortality	77
Misconceptions About HIV Transmission Are Common in Kinshasa	78
Compliance with AID's Mexico City Policy Has Been Careful and Complete	79

UPDATE

Islamic Okay on Sterilization

In November 1990, the Iranian government legalized female contraceptive sterilization and announced that it would be made available free through the health care system.[1] There still will be limits on access, however: A prospective sterilization client must have had at least three children and have received her husband's permission. Family planning programs had been shut down in the first few years after Iran's 1979 revolution, but 12 years later, all contraceptive methods are now available free of charge. Iran has also adopted a plan designed to shrink the total fertility rate from its current level of 6.3 lifetime births per woman to about four per woman, and is sponsoring a media campaign encouraging smaller families. At around the same time as Iran's announcement, a group of Indonesian Muslim clerics made public a consensus statement pronouncing sterilization to be an acceptable contraceptive method.[2] The statement, released during the 1990 National Seminar for Muslim Scholars on Islam and Population Policy, did not represent a blanket endorsement of contraceptive sterilization, however; it concluded that sterilization is acceptable if it is "wisely implemented [and] only after considering medical, psychological and social factors."

[1] N. Roudi, "Iran Eases Limits on Sterilization," *Population Today*, Vol. 19, No. 3, Mar. 1991, p. 3.

[2] "Indonesian Muslim Leaders Allow Sterilization," *Population Headliners*, No. 191, Feb. 1991, p. 1.

Honduras Promotes Breastfeeding

New mothers in Honduras became more likely to breastfeed their infants between 1981 and 1987, especially in urban areas.[1] Data from three nationally representative population surveys show the overall probability of an infant being breastfed at six months of age to have risen from 67 percent in 1981 to 80 percent in 1987; in urban areas, the increase was from 38 percent to 59 percent, while in rural areas it was from 80 percent to 89 percent. The median duration of breastfeeding also rose substantially, from 4.1 to 9.9 months in urban areas and from 16.7 to 18.8 months in rural areas. The gains in breastfeeding were particularly large among babies born in hospitals. Multivariate analyses indicate that a hospital-based breastfeeding promotion campaign played a major role in the increase in breastfeeding, especially in the early 1980s. However, its effects appear to have decreased toward the end of the decade, leading the investigators to caution that "intervention in maternity services to support breastfeeding [may have] approached its limits in Honduras."

[1] B. M. Popkin et al., "An Evaluation of a National Breastfeeding Promotion Programme in Honduras," *Journal of Biosocial Science*, 23:5, 1991.

Zairian Condom Sales Expand

Nearly nine million condoms are thought to have been sold in Zaire in 1990, according to a preliminary report on a social marketing project.[1] In addition, almost two million foaming contraceptive tablets are estimated to have been sold. The project, recently expanded from Kinshasa to four outlying regions, distributes condoms and spermicides to a variety of outlets—pharmacies, stands, hotels and bars, among others. Market research techniques were used to select a suitable brand name ("Prudence") and slogan ("For the confident man") for the condom. To establish a market for condoms, they have initially been priced to sell at below actual costs (a dozen for about half the price of a bottle of beer). The social marketing effort is also closely linked to a mass media campaign on AIDS prevention.

[1] C. Green, "Zaire Leads on Condom Sales," *People*, Vol. 18, No. 1, 1991, p. 37.

Africa's HIV–Tuberculosis Problem

Forty percent of a group of 2,043 tuberculosis patients at treatment centers in Abidjan, Côte d'Ivoire, tested positive for the human immunodeficiency virus (HIV), compared with 10 percent of a group of blood donors of similar ages and backgrounds.[1] Once they had controlled for other factors, investigators concluded that tuberculosis patients in Abidjan were 5.8 times as likely as blood donors to be infected with HIV. Such an association could be seen for both HIV-I and HIV-II infection, and for dual infections as well, with tuberculosis patients being 10.6 times as likely as blood donors to be infected with both strains of HIV. When study participants born in Côte d'Ivoire who had confirmed pulmonary tuberculosis were compared with the blood donors by five-year age-group, the same association was seen throughout the sample. In Abidjan, the investigators estimate, 35 percent of all cases of tuberculosis can be attributed to HIV infection. "In Africa," they observe, "tuberculosis may be the commonest opportunistic infection complicating HIV infection. . . . Efforts to control tuberculosis in sub-Saharan Africa can no longer be dissociated from public health programmes for preventing and managing infection with HIV-I and HIV-II."

[1] K. M. DeCock et al., "Risk of Tuberculosis in Patients with HIV-I and HIV-II Infections in Abidjan, Ivory Coast," *British Medical Journal*, 302:496, 1991.

Chinese Misstate Family-Size Plans

Family-size preferences reported by Chinese women in surveys are probably seriously underreported, according to an analysis of data from a county in Sichuan province.[1] A total of 664 women canvassed in 1987 were asked how many children they would prefer to have in the absence of a national family planning program, but were also asked a series of more general questions about hypothetical ideal family size. Comparisons of the various answers led the investigator to estimate that 84 percent of rural women and 60 percent of urban women who say they would prefer to have one child actually want to have more children. "In fact," the author states, "[underreporting] was the rule rather than the exception among women expressing a preference for one child." Underreporting is much less common among women who say they want two children. Among those who claim to prefer a one-child family, less educated women and rural women are more likely than others to understate their preferences, but because urban and better educated women are far more likely to claim to prefer a one-child family, the latter represent the majority of all women who appear to understate their family-size preference. "In other words," the researcher concludes, "these more 'modern' women appeared to be the most sensitive to the government's one-child policy."

1. J. Wang, "Women's Preferences for Children in Shifang County, Sichuan, China," *Asian and Pacific Population Forum*, Vol. 4, No. 3, 1990, p. 1.

Son Preference in Bangladesh

Bangladeshi women's strong preference for sons may contribute an additional 4–8 percent to overall fertility there.[1] The behavior of a group of 22,819 women in Matlab, a rural section of Bangladesh, was studied between July 1983 and the end of 1986. These women lived in two sets of villages—70 villages in which special family planning and maternal and child health services were available and 79 in which they were not. During the three-and-one-half-year study, fewer women gave birth in the villages with family planning services (59 percent) than in the comparison villages (69 percent), and this differential was particularly large among women with three or more children. Overall, at each family-size level, women with more sons were less likely to have given birth during the study period than were those with fewer sons. The researchers estimate that in the absence of any gender preference, fertility would have been four percent lower in the villages with no special family planning services and eight percent lower in the villages that had such services. They comment that "a program to promote egalitarian attitudes toward children of both sexes might lead to lower fertility."

1. M. K. Chowdhury and R. Bairagi, "Son Preference and Fertility in Bangladesh," *Population and Development Review*, **16**:749, 1990.

Nepal's Social Marketing Success

Contraceptive social marketing in Nepal is reaching women who had never used family planning previously, most of whom seek to limit rather than to space births.[1] Moreover, these customers appear to be so pleased with the availability and convenience of these services that they say they would be willing to pay more for them. A total of 763 women who had obtained contraceptives from 290 medical shops participating in the social marketing program were interviewed. Around 70 percent of those surveyed had heard advertisements for their method on the radio. Oral contraceptive users were quite likely to know about proper pill use and about contraindications to pill use, although they were less likely to know what to do if they missed three pills during a cycle. Between 50 percent and 75 percent of the oral contraceptive users had never used a method before. Eighty percent of the respondents said they would continue to purchase their method through the social marketing program, even if the price were to rise by 50 percent. A parallel survey of retailers revealed that a small (but not negligible) proportion were poorly informed about contraindications to pill use; however, those who had received special training from the social marketing organization were generally more knowledgeable than the other retailers. A majority believed that raising the price by 50 percent would not affect sales, although three-quarters believed that doubling the price would cause a significant sales downturn. At least two-thirds of retailers who had heard of pregnancy detection kits and of injectables were eager to stock them.

1. A. Shrestha, T. T. Kane and H. Hamal, "Contraceptive Social Marketing in Nepal: Consumer and Retailer Knowledge, Needs and Experience," *Journal of Biosocial Science*, **22**:305, 1990.

The Farming Metaphor

Using terms and concepts familiar to poorly educated rural women and men can improve their understanding of family planning concepts and their use of contraceptive methods, claims a Philippine doctor.[1] Juan Flavier, president of the International Institute of Rural Reconstruction, reports that his organization has used interviews with rural Filipinos to devise new approaches for teaching about family planning. First, they found that rural farmers overwhelmingly wanted to know what family planning is and how it works. "Central to the approach," he explains, "is teaching the unfamiliar by building it on the familiar." Thus, they illustrate the concept of birth control by reminding the farmers that mango growers often remove some of the flowers from a branch because a branch bearing too many fruits will break. Likewise, the condom is compared to the plastic bag that farmers sometimes place over the tassel of corn in order to prevent pollen from falling onto the ear immediately below it. Similarly, rocky soil prevents the formation of cassava tubers; thus, the action of the IUD can be likened to the rocks that hinder the root's development. Flavier recommends education "through nonformal means . . . if farming couples are really [to be] free to decide" how many children they are to have.

1. J. M. Flavier, "The Agricultural Approach to Rural Family Planning in the Philippines," *Integration*, No. 26, 1990, p. 35.

Breastfeeding as Family Planning?

Lactation provides a woman with excellent contraceptive protection for the first six months after delivery, and can even serve as a good contraceptive beyond that point, provided that the woman uses another method after menstruation has resumed.[1] Australian investigators collected data on first postpartum menses for 101 women belonging to the Nursing Mothers' Association of Australia; in addition, by conducting hormonal tests on saliva samples collected from most of these women, they were able to determine the timing of ovulation for 89 of them. The results indicate that lactational amenorrhea persists for a mean of 9.5 months and that anovulation lasts for 10.6 months. The women fully breastfed their infants for 5.3 months, on average. The researchers calculate that if the breastfeeding women in their study had used no method of birth control, half would have become pregnant again during the first 12 months. They observe that such a high one-year pregnancy rate indicates that "although breastfeeding alone reduces fertility, it is not a particularly effective or reliable form of contraception." However, they project that if the breastfeeding women all had started using another method when menses resumed, only seven percent would have become pregnant after one year. The investigators conclude that "an extended period of breastfeeding can produce long periods of lactational amenorrhea and thus exert a major contraceptive effect."

1. R. V. Short et al., "Contraceptive Effects of Extended Lactational Amenorrhea: Beyond the Bellagio Consensus," *Lancet*, **I**:715, 1991.

Contraceptive Failure Rates in Developing Countries: Evidence from the Demographic and Health Surveys

Overall failure rates—inclusive of sterilization—vary substantially across countries, ranging from low values of two percent in Thailand and three precent in Indonesia to high values of 16 percent in Peru and almost 29 percent in Bolivia.

By Lorenzo Moreno and Noreen Goldman

Summary

Based on Demographic and Health Survey data, contraceptive failure rates are estimated for 15 countries in Latin America, Asia and North Africa. The results are generally consistent with those reported in other studies in developed and developing countries. Method-specific failure rates vary dramatically across regions—rates for the Asian countries are generally below those for both the North African and the Latin American countries—as well as within regions. For example, first-year life-table rates for the pill vary between 5.4 percent for Brazil and 11.8 percent for the Dominican Republic. Such variation is believed to result both from data reporting problems and from true variation in the consistency of use across societies.

Introduction

Since the 1960s, data from hundreds of large-scale surveys have documented a substantial increase in contraceptive practice in developing countries. For example, between the mid-1970s and the mid-1980s, the average level of contraceptive prevalence rose from 36 percent to 49 percent in Latin America and from 41 percent to 57 percent in Southeast Asia.[1] Until the 1970s there was little information available on the effectiveness of contraceptive practice in these countries. In recent years, the subject has received more attention: Contraceptive effectiveness has become a more important determinant of fertility because of rising contraceptive prevalence, decreasing desired family sizes and the unavailability of abortion in many countries.[2]

Undoubtedly, the paucity of estimates of contraceptive failure results in large part from the limitations of the available data. The national fertility and family planning surveys most frequently used to track contraceptive behavior since the 1960s—particularly the Contraceptive Prevalence Survey (CPS) and the World Fertility Survey (WFS)—mainly sought information on knowledge, availability and accessibility of contraceptive methods and on current use and ever-use of a method. Occasionally a survey collected additional data on contraceptive use in the respondents' most recent birth interval or intervals, but rarely did either type of survey elicit the two pieces of information necessary for the calculation of contraceptive failure rates: duration of use, and reason for contraceptive discontinuation.* As a result, most current estimates of failure for developing countries were obtained either from clinical trials or program surveys of modern medical methods,[3] or from specialized studies, such as those using a calendar to collect information on contraceptive use.[4]

Because of the availability of data from Demographic and Health Surveys (DHS), failure rates can now be estimated for a large number of developing countries in Latin America, Asia and Africa. These data offer several advantages over information collected from clinical trials or user studies: the ability to calculate failure rates for traditional as well as modern methods, the use of a national sample not characterized by the selection biases frequently associated with other types of samples, and data that are not affected by loss to follow-up.

The DHS core questionnaire contains a truncated contraceptive history. As described in detail later, the questionnaire allows for the coding of one or two methods within each recent birth interval. (In this article we refer only to the version of the core questionnaire used in countries with moderate to high levels of contraceptive use.[5]) As described later, this information appears to be sufficient for the calculation of life-table probabilities of contraceptive failure during the first year of use, even though the surveys contain no specific information on the timing of use. As argued by James Trussell and Kathryn Kost,[6] the life-table estimate—which explicitly controls for duration of use—is the most appropriate way of assessing the relative efficacies of different contraceptive methods and for comparing method failure across subgroups or populations.

The objective of this analysis is to obtain life-table estimates of contraceptive failure for 15 countries with completed DHS surveys and to compare these estimates with those previously obtained for developed countries[7] and for selected developing countries.[8] We seek answers to the following questions: Are the rates of method-specific failure in the developing world greater than those in industrialized countries? Do failure rates in countries with strong family planning programs differ from those with weaker programs? How varied are method-specific failure rates across countries and across regions?

Lorenzo Moreno is on the research staff and Noreen Goldman is professor of demography and public affairs at the Office of Population Research, Princeton University. The research for this article was supported in part by National Institute for Child Health and Development Grant R01-HD-22417 and the Institute for Resource Development/Macro Systems. The authors would like to thank Kathryn Kost, Anne Pebley, Germán Rodríguez, James Trussell and Charles Westoff for helpful comments on an earlier draft of this article.

*Only in Egypt, the Philippines and Mexico did the Contraceptive Prevalence Surveys obtain information on reasons for discontinuation or on duration of use of recent methods. In some cases, the World Fertility Survey (WFS) asked about use in the open interval and last closed birth interval, but this information was usually restricted to the method used and the reason for termination; in very few cases was information obtained on the timing and duration of use. (See: S. Singh, "Comparability of Questionnaires: Forty-one WFS Countries," *WFS Comparative Studies*, No. 32, International Statistical Institute, Voorburg, The Netherlands, 1984) In some of these WFS surveys, the data were sufficient for the calculation of extended-use failure rates (see: N. Goldman et al., "Contraceptive Failure Rates in Latin America," *Studies in Family Planning*, 14:50, 1983) but not for use-failure rates. Only in Malaysia and Korea did the WFS collect extensive contraceptive use information.

Questionnaire Structure

The standard, or core, DHS questionnaire, administered to women between 15 and 49 years of age, collects a full birth history as well as considerable information on the respondent's background, contraceptive and postpartum behavior, and the health of any young children she may have. One section of the questionnaire is devoted to contraception: After data on contraceptive knowledge, ever-use, availability and acceptability are collected, a series of questions elicits information about current use and use in the open interval (the period since the most recent birth). A tabular format is then used to record use information for the intervals closed by births that occurred during the five years preceding the year of the interview. For example, for an interview that took place in 1986, contraceptive use information is collected for intervals preceding births since January 1981.

The nature of the information provided varies between the open and closed birth intervals. For the open interval, interviewers determined the duration of use of the current method. If a woman used two separate methods during this interval, or if she was not currently using a method, she was asked the duration of use and the reason for discontinuation of the previous method. Thus, essentially complete contraceptive information is obtained for up to two segments of use in the open interval. With regard to closed birth intervals, the questionnaire also allows for the coding of up to two methods within each of the relevant birth intervals. However, data on duration of use and reason for discontinuation are collected for only the last method in each interval; with the exception of the surveys in Thailand and Mexico, no information on the timing of use was obtained for segments in closed intervals.

The DHS core questionnaire falls short of a calendar survey in two ways: the lack of information on timing of use in closed intervals, and the collection of data for only two segments of use in the open interval and, basically, only one in the closed intervals. Experimental questionnaires in Peru and the Dominican Republic used six-year monthly calendars to collect data on contraceptive use, as well as fertility, postpartum, marital union, residence and employment information. Detailed comparisons were made between the information collected with the experimental calendar and that collected from the core questionnaires in these two countries to determine if the omissions in the latter had any impact on estimates of failure.[9] The results indicate that although the core questionnaire leads to modest underestimates of prevalence of use for periods prior to a survey, the estimates of method-specific failure rates are generally similar to those obtained from the corresponding calendars. Simulation exercises carried out for Peru demonstrated that estimates of failure are much more sensitive to reported durations of use than to the reported starting or stopping dates of use.[10] Thus, although information on the timing of use is helpful in estimating failure—as well as prevalence—reasonable estimates of failure can be obtained for approximate time periods without such data.

Data and Methods

The data used in this paper are derived from nationally representative samples of women of reproductive age in nine countries in Latin America, three in Asia and three in North Africa, all of which were DHS participants. These countries and their survey years are: Bolivia, 1989; Brazil, 1986; Colombia, 1986; Dominican Republic, 1986; Ecuador, 1987; Egypt, 1988; Guatemala, 1987; Indonesia, 1987; Mexico, 1987; Morocco, 1987; Peru, 1986; Sri Lanka, 1987; Thailand, 1987; Trinidad and Tobago, 1987; and Tunisia, 1988. All calculations are based on the Standard Recode version of the relevant data and are weighted for the eight countries that did not have self-weighting samples.

Table 1 presents three measures for each country: the total fertility rate for the three-year period prior to the survey, the contraceptive prevalence rate among married women aged 15–49 (in Brazil and Guatemala, aged 15–44), and a measure of the national family planning effort as of the early 1980s. The first two measures were calculated from the relevant data tapes of the DHS surveys, and the third was based on Robert Lapham and W. Parker Mauldin's 30-item evaluation scale consisting of eight items for policy- and stage-setting activities, 13 for service-related activities, three for record keeping and evaluation, and six for the availability and accessibility of fertility regulation supplies and services.[11] The index can assume values from 0–120.

Total fertility rates range from a low of 2.2 children per woman in Thailand to a high of 5.5 children in Guatemala. Correspondingly, contraceptive prevalence is highest in Thailand, with more than two-thirds of women using a contraceptive method, and lowest in Guatemala, with fewer than one-quarter of married women using a method. Only in Guatemala, Bolivia, Egypt and Morocco are prevalence rates below 40 percent. On the index of family planning effort, values range from a low of nine in Bolivia to a high of 90 in Indonesia.

Table 1. Total fertility rate, current contraceptive use among married women and family planning program effort, by country

Country	Total fertility rate*	% using a method	Program effort†
Latin America			
Bolivia, 1989	4.97	30.3	9
Brazil, 1986‡	3.37	66.2	51
Colombia, 1986	3.17	65.0	85
Dominican Republic, 1986	3.64	49.8	66
Ecuador, 1987	4.13	44.3	42
Guatemala, 1987‡	5.50	23.3	34
Mexico, 1987	3.99	52.9	60
Peru, 1986	4.04	46.2	26
Trinidad and Tobago, 1987	3.05	53.1	56
Asia			
Indonesia, 1987	3.30	47.7	90
Sri Lanka, 1987	2.70	61.7	80
Thailand, 1987	2.23	67.5‡	73
N. Africa			
Egypt, 1988	4.41	37.8	48
Morocco, 1987	4.58	35.9	43
Tunisia, 1988	4.30	49.8	70

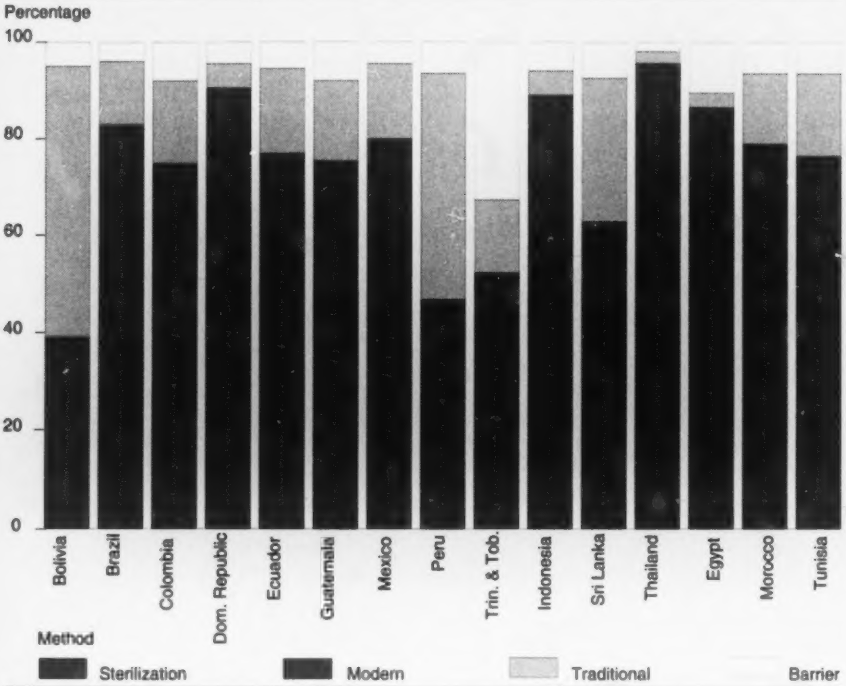
*For the three years preceding the survey.

†This score measures the strength of the family planning program effort as of 1982. The measure is based on 30 items which are classified under four general headings: policy- and stage-setting activities; service and service-related activities; record keeping and evaluation; and availability and accessibility of fertility control supplies and services. The index can assume values from 0–120 (see reference 11).

‡Women aged 15–44.

Figure 1 (page 46) considers the specific types of contraceptive use in each country. Use is classified into four categories: sterilization, modern methods (pill, IUD, injectables and implants), traditional methods (rhythm and withdrawal), and barrier methods (primarily the condom and vaginal methods). The graph indicates large variations across countries in the types of methods used. For example, while modern methods dominate in the Asian and North African countries (and in some Latin American countries), use of traditional methods is high in Bolivia and Peru, and barrier method use is high only in Trinidad and Tobago. Sterilization is by far the most common method in the Dominican Republic, yet is relatively uncommon in Bolivia, Egypt, Indonesia, Morocco, Peru and Trinidad and Tobago. Clearly, we would expect to see large variations in the overall failure rates among these countries because of the differing compositions of method use.

Figure 1. Percentage distribution of contraceptive users, by type of method, according to country



Life-Table Calculations

Throughout the demographic literature, life tables have been used to measure several different types of contraceptive failure: user failure, extended-use failure, and method failure. User failure includes only pregnancies that occur while a couple considers themselves to be users of the method; extended-use failure includes unintended pregnancies during and subsequent to actual use, but prior to a subsequent pregnancy; and method failure includes only pregnancies directly attributable to the method, not to improper use.[12]

There are also two major ways of calculating failure—multiple decrement and the associated single decrement (often referred to elsewhere as net and gross rates, respectively). Whereas the multiple decrement measure recognizes that failures occur within the same time intervals as do other types of contraceptive terminations (such as discontinuing use to become pregnant or discontinuing the method for other reasons), the single decrement measure is a hypothetical calculation that examines failure in the absence of any other "competing risk."[13] Although multiple decrement calculations are more indicative of the actual proportion of couples likely to experience a failure, they can vary among methods simply because discontinuation rates vary; if discontinuation rates are high, multiple decrement failure rates will be relatively low because most women will have "exited" the life table for other reasons.

Since our interest in this analysis is on failure that results both from improper use of a method and from the inherent difficulties in using a method, we consider life-table probabilities of user failure. Moreover, since the essence of the study is comparative, we restrict ourselves to single-decrement measures of failure, namely, the probability of becoming pregnant (by a specified duration) while using a method, in the absence of any other form of contraceptive discontinuation. We present only the corresponding first-year probability—also known as the first-year rate—which is the most common life-table measure employed in other studies. The first-year rate is derived from the first 12 months of contraceptive use for each episode of use within the sampling frame. Since fetal deaths are not reported in the DHS maternity history, all failures (except current pregnancies) refer to pregnancies that produced live births.

The life tables constructed in this analysis are based on interviews with women who were in a union at the time they were surveyed. We included in the calculation all contraceptive use segments reported for intervals occurring after the starting date of the contraceptive history (this includes up to two segments in the open interval and the last segment of use within each closed interval). Thus, for a survey that took place at the end of 1986, all segments of use reported for birth intervals beginning after January 1981 would contribute exposure to the life-table calculation, according to the reported duration of use.[*] Although the questionnaire collected information for one interval that began prior to the reference period, use within this interval could have occurred as far back as 10 or 20 years before the survey and was not included in our calculations. Restriction of the sampling frame of use segments to intervals beginning in the reference period imposes an approximate time period on the life-table calculation.[†]

Because our sampling frame is restricted to women proven to be fertile during a specified period, there are potential biases associated with the resulting estimates.[‡] However, a comparison of estimates derived from this definition of the sampling frame with estimates based on all contraceptive exposure from the experimental DHS survey in Peru revealed only small differences.[14]

The number of contraceptive use segments included in the life-table calculations for the first year of use (for all methods combined) ranges from 560 in Guatemala to 4,258 in Indonesia. Since the numbers become considerably smaller in method-specific calculations, separate life-table calculations were carried out for only four specific methods: the pill, the IUD, rhythm and withdrawal. The remaining methods, including the condom, vaginal methods, injections and implants, have been grouped into the "other" category. Since there were few failures resulting from sterilization (there were one or more failures in the calculations for Brazil, Indonesia, Sri Lanka and Thailand), separate life-table calculations are not shown for this method. However, first-year failure rates for all methods combined have been calculated with sterilization both included and excluded from exposure. Greenwood's formula was used to obtain approximate values for the standard errors of the life-table survivorship probabilities on the assumption of a simple random sampling design.[15]*

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[*] All exposure was censored three months prior to an interview so that first-trimester pregnancies, which are notoriously underreported, would be excluded from the calculations.

[†] With this sampling frame, we lose relatively more exposure in the beginning of the period. For example, much of the use in 1981 would have taken place within birth intervals which began prior to 1981. However, without specific information on the starting or stopping dates of use, we cannot calculate a true period rate of contraceptive failure. Comparisons with the calendar in the Dominican Republic experimental survey indicate that the sampling frame used here captures 64 percent of all first-year failures that occurred during the six-year calendar period (1981–1986). Thus, life-table failure rates based on our sampling frame capture roughly 6 x .64 or 3.8 years' worth of failures in the Dominican Republic.

[‡] For example, this sampling frame would likely exclude recently married women, older women and women who use contraception effectively, and would definitely exclude infertile women or women who consistently abort pregnancies. The definition of the sampling frame could be broadened to include first intervals (i.e., the interval between marriage and first birth) which occur during the reference period. A potential complication with this expanded frame is that one would have to assume that use prior to the first birth occurred after marriage.

Table 2. First-year probabilities of contraceptive failure (and standard errors), by country, according to method

Country	Pill	IUD	Rhythm	Withdrawal	Other	All methods	
						Inc. ster.	Exc. ster.
Latin America							
Bolivia	10.5 (3.8)	3.0 (1.2)	21.2 (1.5)	34.8 (7.6)	35.4 (4.6)	19.2 (1.2)	20.4 (1.2)
Brazil	5.4 (0.8)	13.0 (7.4)	22.8 (3.7)	20.7 (3.1)	16.8 (3.9)	7.9 (0.7)	10.4 (0.9)
Colombia	7.7 (1.2)	5.3 (1.4)	24.8 (3.9)	20.1 (3.3)	23.6 (3.5)	11.7 (0.9)	13.7 (1.0)
Dominican Republic	11.8 (1.4)	3.6 (1.7)	19.9 (4.5)	29.2 (5.4)	23.3 (4.1)	8.7 (0.7)	14.0 (1.2)
Ecuador	5.8 (1.4)	4.6 (1.6)	13.9 (2.9)	27.2 (6.8)	21.1 (4.9)	8.1 (0.9)	10.0 (1.1)
Guatemala	9.8 (2.4)	7.7 (3.7)	24.6 (4.5)	12.0 (6.6)	16.6 (4.5)	10.9 (1.4)	14.5 (1.8)
Mexico	5.4 (0.9)	1.5 (0.5)	3.7 (1.4)	4.0 (1.7)	5.8 (1.3)	3.2 (0.4)	4.1 (0.5)
Peru	5.9 (2.0)	4.2 (1.9)	23.6 (2.0)	17.3 (4.2)	16.8 (3.5)	15.7 (1.2)	16.7 (1.2)
Trinidad and Tobago	5.9 (1.4)	4.2 (2.4)	13.7 (5.4)	17.6 (4.2)	15.2 (1.9)	10.3 (1.0)	11.3 (1.1)
Asia							
Indonesia	2.7 (0.5)	1.9 (0.5)	10.8 (3.2)	8.5 (3.0)	2.6 (0.5)	2.8 (0.3)	2.9 (0.3)
Sri Lanka	7.2 (1.8)	3.4 (1.9)	13.0 (1.3)	11.5 (2.6)	8.1 (1.8)	7.4 (0.6)	10.6 (0.8)
Thailand	2.8 (0.6)	2.5 (1.0)	14.8 (5.3)	7.4 (3.5)	1.0 (0.4)	1.9 (0.3)	2.5 (0.4)
N. Africa							
Egypt	6.9 (0.7)	1.8 (0.4)	38.4 (7.2)	10.3 (5.0)	8.9 (1.4)	6.0 (0.4)	6.0 (0.4)
Morocco	8.6 (0.8)	1.1 (1.1)	30.5 (3.8)	11.5 (2.9)	22.6 (4.1)	10.9 (0.8)	11.1 (0.8)
Tunisia	5.4 (1.1)	2.7 (0.7)	14.2 (2.5)	12.5 (4.2)	21.2 (3.2)	7.4 (0.7)	8.0 (0.8)

Results

Table 2 presents first-year failure rates by method, along with the associated standard errors, for each of the 15 countries. Overall, the resulting life-table values are plausible. The median first-year failure rates (not shown) are 5.9 percent for the pill, 3.4 percent for the IUD, 19.9 percent for rhythm, and 12.5 percent for withdrawal. In only three cases do the failure rates for the pill or the IUD exceed 10 percent: in Bolivia and the Dominican Republic for the pill and in Brazil for the the IUD.

By contrast, failure rates exceed 20 percent for withdrawal in five countries and for rhythm in seven countries. The category of "other" methods is characterized by the greatest variation in failure rates partly because of the different methods used across countries; for example, there is heavy reliance on injections in Indonesia and Thailand and frequent use of the condom and abstinence in Bolivia, Egypt, Tunisia, Morocco and Sri Lanka.

The failure rates for Mexico show little variation by method and are consistently low. We speculate that the resulting estimates in Mexico are distorted by reporting errors. The Mexico survey was the only DHS survey to collect information on contraceptive use without reference to birth intervals. The fact that dates and durations of use were frequently missing appears to have resulted in several anomalous findings for Mexico.†

Because of the small number of Asian and North African countries included in this analysis, it is difficult to tell whether life-table failure rates show variation across regions. Our estimates suggest that the rates for the Asian countries—particularly Indonesia and Thailand—generally fall well below the average values for the other countries. The variation across countries appears to correlate strongly with Lapham and Mauldin's measure of the degree of family planning effort in each country. For example, there is an average correlation of –0.75 between the overall first-year failure rate (including sterilization) and the index of effort. The only major exception is Colombia, which has a strong family planning effort but a relatively high failure rate (12 percent). As shown in Table 1, the Asian countries generally have both the highest indices of effort and the lowest failure rates, while Bolivia and Peru have both the lowest indices of effort and the highest failure rates in the sample. The high correlation does not result primarily from wider use of modern methods in countries with strong family planning efforts. Correlations between the measure of effort and the first-year failure rate for the pill, rhythm, withdrawal and other methods are –0.46, –0.48, –0.52 and –0.59, respectively; the correlation for the IUD is much smaller (–0.20). This suggests that a strong family planning program results in more effective use of traditional methods, as well as use of modern methods, perhaps as a result of increased information and motivation. Undoubtedly, however, part of this high correlation also results from social and economic factors that are probably associated with both the failure rates and the level of family planning effort across countries.‡

To see how these failure rates compare with those reported in previous surveys in both developed and developing countries, we rely primarily on three comprehensive recent reviews of failure rates by Trussell and Kost, Shireen Jejeebhoy and Charles Hammerslough.[16] In each review, as in our analysis, rates for a given method vary enormously across countries, making comparisons among reviews difficult. Such variation could result from a variety of factors, including true differences in consistency or correctness of method use and a combination of recall and reporting errors.

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*Since the DHS surveys are based on multistage cluster samples, the actual sampling errors are larger than those calculated here under the assumption of simple random samples.

†In the Mexico DHS, a history of contraceptive use was collected for the period between January 1982 and the interview date (March to May 1987) without reference to the interval between successive births (See: *Encuesta Nacional Sobre Fecundidad y Salud, 1987*, Dirección General de Planificación Familiar, Secretaría de Salud, and Institute for Resource Development/Macro Systems, Mexico City, 1989) This type of data collection has been shown to result in poor reporting of contraceptive use (See: A. R. Pebley, N. Goldman and M. K. Choe, "Evaluation of Contraceptive History Data in the Republic of Korea," *Studies in Family Planning*, **17**:22, 1986). The result in the Mexico DHS was a large number of missing responses for starting and stopping dates of use. Considerable imputation was required to convert the contraceptive history information into segments of use within birth intervals; moreover, a large percentage of segments with missing durations of use remained. (In the life-table calculations presented in this analysis, segments with missing durations of use were excluded from the calculation.) Tabulations not shown here indicate yet another problem with these estimates—the percent of failures that occurred during the first year of use was substantially smaller in Mexico than in any of the other 14 surveys.

‡Calculations not presented here indicate that the correlation would be –0.64 (in other words, remain almost as high) after controlling for women's education and region of residence.

The main difference between the rates presented in this study and those reported for developed countries concerns the relative efficacy of the pill and the IUD. In our study, the failure rate of the pill exceeds that of the IUD in all countries except Brazil, for which the standard error of the IUD failure rate is very high. In contrast, among the studies in the United States and Western Europe discussed by Trussell and Kost as well as by Jejeebhoy, the first-year failure rate of the IUD generally exceeds that of the pill. The reversal appears to be attributable to higher user failure rates associated with the pill in developing countries, compared with the United States and Europe. For example, the average first-year failure rate for the pill reported in Trussell and Kost is about two percent, yet the corresponding rate in our study exceeds five percent in 13 out of the 15 countries (only Indonesia and Thailand have rates comparable to those for the United States). The higher failure rates for the pill found in our study are consistent with higher first-year failure rates for the pill (compared with the IUD) in previous studies in the Philippines, Venezuela, Egypt, Bangladesh and Korea.[17]

The average first-year failure rate of three percent for the IUD in our study is close to the average of about two percent for the studies considered by Trussell and Kost and the range of three to five percent in previous studies in Egypt, the Philippines and Venezuela.[18] The IUD shows less variation in failure rates across countries than do the other methods in our study. IUD failures are more likely to result from method failure (as opposed to improper or inconsistent use); this probably results in smaller variances in user failure rates.

Failure rates for rhythm in our study are generally consistent with those reported elsewhere. For example, the average first-year failure rate of 20 percent in our study compares with a typical value of about 16 percent in the Trussell and Kost review, a rate of 20 percent in a recent study of the ovulation method,[19] and rates of 20 percent and 33 percent in the Philippines and Venezuela, respectively.[20] Not surprisingly, the variation in the failure rate for rhythm as well as for withdrawal exceeds that for the pill and the IUD.

The final two columns of Table 2 indicate the overall first-year failure rates, including and excluding sterilization. Once again, the rates for Mexico are much lower than in other Latin American countries. The failure rates inclusive of sterilization show substantial variation across countries, ranging from low values of about two percent in Thailand and three percent in Indonesia to high values of 16 percent in Peru and almost 20 percent in Bolivia. The range of failure rates remains as large when sterilization is excluded. Although part of this range results from method-specific variation—method-specific failure rates in the two Latin American countries consistently exceed those in the two Asian countries, sometimes by a factor of four—the range is widened by the heavy reliance on traditional methods of contraception in Bolivia and Peru. The importance of sterilization in reducing the failure rates in Brazil, the Dominican Republic, Guatemala and Sri Lanka is apparent from a comparison of the relatively wide differences between the estimates including and excluding sterilization in these countries.

Discussion

Quality of data is important in estimating contraceptive failure rates. Any estimate of failure depends critically on whether or not particular births are reported as having resulted from contraceptive failure, and respondents are likely to be sensitive about reporting such information. In addition, there are obvious ambiguities of classification for conceptions following imperfect or sporadic method use. Life-table measures are also dependent on the correct reporting of durations for each segment of use and the acknowledgment of multiple segments of use within intervals.

Recent analyses based on a comparison between the DHS core questionnaire and an experimental questionnaire fielded in Peru and in the Dominican Republic[21] indicate that the use of a monthly calendar for the collection of contraceptive information leads to more complete and more accurate reporting, and subsequently to more reliable estimates of contraceptive prevalence and discontinuation. The DHS project has therefore decided to include a monthly calendar for a five- to six-year period in the second round of surveys in countries with a significant level of contraceptive practice. The calendar is designed to collect a record of contraceptive use (as it relates to pregnancies and births in the period), detailed information on the reasons for contraceptive discontinuation, and a monthly record of postpartum behavior; the latter measure is also important for estimating failure, since women using a contraceptive method may not be exposed to the risk of conception.

Using a calendar will allow for the inclusion of all relevant exposure and failures within the specified reference period. The resulting failure rates will not be affected by the potential sampling frame biases described earlier, and they should have substantially smaller standard errors than those presented here. The next round of DHS data is expected to lead to both more accurate and more robust measures of contraceptive failure for a large number of developing countries.

References

1. "Levels and Trends of Contraceptive Use as Assessed in 1988," *Population Studies 110*, United Nations, New York, 1989.

2. J. Bongaarts and G. Rodriguez, "A New Method for Estimating Contraceptive Failure Rates," *Working Paper No. 6*, The Population Council, New York, 1989; C. R. Hammerslough, "Overview" and "Introduction," *Measuring the Dynamics of Contraceptive Use*, proceedings of the United Nations Expert Group Meeting on Measuring the Dynamics of Contraceptive Use, United Nations, New York, 1991.

3. J. E. Laing, "Differentials in Contraceptive Use-Effectiveness in the Philippines," *Studies in Family Planning*, **10**:302, 1974; J. Bailey, C. Measham and M. Umaña, "Fertility and Contraceptive Practice, Bogotá, 1964–74," *Studies in Family Planning*, **15**:249, 1976; A. Gallegos et al., "Recent Trends in Contraceptive Use in Mexico," *Studies in Family Planning*, **14**:50, 1977; J. E. Laing and A. N. Alcántara, "Final Report on the 1976 National Acceptor Survey," unpublished manuscript, University of the Philippines Population Institute, Manila, 1980; A. R. Khan, W. H. Mosley and F. A. Jahan, "Early Experience with Use of Norethisterone Enanthate as Injectable Contraceptive in Model Clinic," *Johns Hopkins University Fertility Research Program Report No. 7*, Dacca, Bangladesh, 1976; J. E. Laing, "Estimation of National Contraceptive Prevalence from Survey Data on Acceptors," unpublished manuscript, University of the Philippines Population Institute, Manila, 1977; P. Prior, "IUD Use-Effectiveness in an Urban Guatemalan Clinic," Bulletin of the Pan American Health Organization, **11**:117; T. Narkavonnakit, T. Bennett and T. R. Balakrishnan, "Continuation of Injectable Contraceptives in Thailand," *Studies in Family Planning*, **13**:99, 1982; D. Martínez and R. F. García-Flores, "La T Postparto, un Anticonceptivo Intrauterino Para el Puerperio Inmediato," *Ginecología y Obstetricia de México*, **51**:331; B. Affandi et al., "Clinical Trials of Norplant in Indonesia," in M. M. Shaaban, ed., *The Norplant Subdermal Contraceptive System*, Assiut University, Assiut, 1984, p. 43; R. R. Lara, "Métodos de Barrera," in *Planificación Familiar, Población, Salud Materno-Infantil*, J. Martínez Manautou and J. Giner, eds., Instituto Mexicano del Seguro Social, Subdirección General Médica, Jefatura de Servicios de Planificatión Familiar, 1984, p. 335; A. Y. Choudhury et al., *Use-Effectiveness of Oral Pills and Condoms*, technical report, Program for the Introduction and Adaption of Contraceptive Technology, Dacca/Bangladesh, 1986, p. 158; J. Gao et al., "A Randomized Comparative Clinical Evaluation of the Steel Ring, the VCu 200 and the TCu 220c IUDs," *Contraception*, **33**:443, 1986; M. Salah et al., "Five-year Experience With the Norplant Implants in Assiut, Egypt," *Contraception*, **35**:543; Chi et al., "Clinical Acceptability, Use-Patterns and Use-Effectiveness of the Vaginal Contraceptive Sponge and Neo Sampoon Tablets—An International Multi-Center Randomized Clinical Trial," *Contraception*, **36**:499, 1987; K. Lassner et al., "Analysis of Sterilization Failure in Brazil," *International Journal of Gynecology and Obstetrics*, **27**:255, 1988;

D. Nolasco, "Can Natural Family Planning Really Work?," *Population Forum*, 1989, p. 13; R. Ramos, "A Comparative Analysis of Three Different Dose Combinations of Oral Contraceptives," *Contraception*, **35**:543, 1989.

4. S. Gaslonde and E. Carrasco, "The Impact of Some Intermediate Variables on Fertility: Evidence from the Venezuelan National Survey," World Fertility Survey Occasional Papers, No. 23, Voorburg, The Netherlands, 1982; J. E. Laing, "Natural Family Planning in the Philippines, *Studies in Family Planning*, **15**:49;—"Continuation and Effectiveness of Contraceptive Practice: A Cross-Sectional Approach," *Studies in Family Planning*, **16**:138, 1985.

5. Model "A" questionnaire, *DHS Basic Documentation No. 3*, Columbia, MD, 1987.

6. J. Trussell and K. Kost, "Contraceptive Failure in the United States: A Critical Review of the Literature," *Studies in Family Planning*, **18**:237, 1987.

7. Ibid.

8. C. R. Hammerslough, 1990, op. cit. (see reference 2).

9. L. Moreno, N. Goldman and O. Babakol, "Collection of Survey Data on Contraception: Experimental Studies in Peru and the Dominican Republic," paper presented at the annual meeting of the Population Association of America, Toronto, May 3–5, 1990.

10. N. Goldman, L. Moreno and C. F. Westoff, "Peru Experimental Study: An Evaluation of Fertility and Child Health Information," Office of Population Research, Princeton University, and Demographic and Health Surveys (DHS), Institute for Resource Development/Macro Systems, Columbia, MD, 1989.

11. R. Lapham and W. P. Mauldin, "Contraceptive Prevalence: The Influence of Organized Family Planning Programs," *Studies in Family Planning*, **16**:117, 1985.

12. C. Tietze, "Ranking of Contraceptive Methods By Levels of Effectiveness," *Advances in Planned Parenthood*, **6**:117, 1971; J. Trussell and K. Kost, 1987, op. cit. (see reference 6).

13. R. Potter et al., "Appendix X.2," in R. Freedman and J. Y. Takeshita, *Family Planning in Taiwan*, Princeton University Press, Princeton, 1969, p. 458; C. Tietze and S. Lewit, "Statistical Evaluation of Contraceptive Methods," *Clinical Obstetrics and Gynecology*, **17**:121, 1974.

14. N. Goldman, L. Moreno and C. F. Westoff, 1989, op. cit. (see reference 10), p. 51.

15. R. C. Elandt-Johnson and N. L. Johnson, *Survival Models and Data Analysis*, John Wiley and Sons, New York, 1980.

16. J. Trussell and K. Kost, 1987, op. cit. (see reference 6); S. Jejeebhoy, "Measuring Contraceptive Use-Failure and Continuation: An Overview of New Approaches," *Measuring the Dynamics of Contraceptive Use*, proceedings of the United Nations Expert Group Meeting on Measuring the Dynamics of Contraceptive Use, United Nations, New York, 1988; and C. R. Hammerslough, 1991, op. cit. (see reference 2).

17. S. Jejeebhoy, 1988, op. cit. (see reference 16); C. Hammerslough, 1990, op. cit. (see reference 2); I. H. Park and S. K. Kong, "Contraceptive Failure and Discontinuation in Korea," *Comparative Study of Fertility Control Experiences in Republic of Korea and Republic of China*, Korea Institute for Population and Health, Seoul, 1987, p. 121.

18. B. Entwisle and H. A. Sayed, "Estimation of Use-Failure Rates for the Pill and Intrauterine Device in Egypt: An Assessment of Life Table and Current Status Approaches," *Measuring the Dynamics of Contraceptive Use*, proceedings of the United Nations Expert Group Meeting on Measuring the Dynamics of Contraceptive Use, United Nations, New York, 1991; and S. Jejeebhoy, 1988, op. cit. (see reference 16).

19. J. Trussell and L. Grummer-Strawn, "Contraceptive Failure of the Ovulation Method of Periodic Abstinence," *International Family Planning Perspectives*, **16**:5, 1990.

20. S. Jejeebhoy, 1988, op. cit. (see reference 16).

21. N. Goldman, L. Moreno and C. F. Westoff, "Peru Experimental Study: An Evaluation of Fertility and Child Health Information," Office of Population Research, Princeton University, and Demographic and Health Surveys, Institute for Resource Development/Macro Systems, Columbia, MD, 1989; and C. F. Westoff, N. Goldman and L. Moreno, "Dominican Republic Experimental Study: An Evaluation of Fertility and Child Health Information," Office of Population Research, Princeton University and Demographic and Health Surveys, Institute for Resource Development/Macro Systems, Columbia, MD, 1990.

Resumen

En base a datos de las Encuestas de Demografía y de Salud, tasas de falla de anticonceptivos fueron estimadas para 15 países en América Latina, Asia y Africa del Norte. Las medidas resultantes son generalmente consistentes con las reportadas en otros estudios en países desarrollados y en vías de desarrollo. Tasas de falla específicas por método varían dramáticamente tanto entre regiones como dentro de estas regiones. Por ejemplo, las tasas para los países asiáticos son generalmente menores que aquéllas en los países del Norte de Africa y de América Latina, y dentro de América Latina, las tasas de falla del primer año para la píldora varían entre 5,4 por ciento en Brasil y 11,8 por ciento en la República Dominicana. Se piensa que la variación se debe tanto a problemas de notificación de los datos así como a variaciones reales en la consistencia de uso entre sociedades.

Résumé

Les taux d'échec de la contraception sont estimés pour 15 pays d'Amérique latine, d'Asie et d'Afrique du Nord, en se basant sur les données tirées des Enquêtes démographiques et de santé. Les chiffres qui en résultent sont généralement compatibles avec ceux signalés dans d'autres études effectuées dans les pays développés et en développement. Les taux d'échec spécifiques aux méthodes varient considérablement d'une région à l'autre—les taux des pays asiatiques sont généralement inférieurs à ceux des pays d'Afrique du Nord et d'Amérique latine—ainsi qu'à l'intérieur d'une région. Ainsi, les taux d'échec de la première année pour la pilule, calculés en faisant usage de la méthode des tables de mortalité, varient entre 5,4 pour cent pour le Brésil et 11,8 pour cent pour la République dominicaine. On croit cette variation attribuable à des problèmes de communication de données et à une variation véritable dans l'uniformité d'utilisation d'une société à l'autre.

Family Planning Knowledge, Attitudes And Practices of Males in Ilorin, Nigeria

"Although the use of contraceptives among [Ilorin] men in our study was limited, favorable attitudes toward family planning and a willingness to use contraceptives have clearly emerged, probably recently, among some of the population."

By Gbolahan A. Oni and James McCarthy

Summary

A household survey conducted between September 1988 and January 1989 in Ilorin, Nigeria, yielded data on the contraceptive knowledge, attitudes and practices of 1,022 men. Although the sample is not representative of the city, the data provide comparative information by level of education and area of residence, which serves as a proxy for socioeconomic status.

Contraceptive knowledge is virtually universal among these men, with the condom and oral contraceptives the most commonly known methods. The condom is also the most commonly used method, yet less than half of men from the most educated and highest socioeconomic groups have ever used it.

The majority of men at all education and residence levels have positive attitudes toward family planning, and contraceptive use is associated with communication about family planning between husbands and wives. Among men who say they have had such discussions, 22–60 percent report that their wives use a method, compared with 4–10 percent of those who say they have not discussed family planning with their wives.

Introduction

In research on the determinants of fertility in sub-Saharan Africa, and in programs designed to increase contraceptive use among African populations, increasing attention is being paid to the contraceptive knowledge, attitudes and practices of African men.[1] This interest stems from the widely held belief that in the patriarchal, traditional African family, the role of husbands is paramount in couples' decisions about fertility regulation.[2] Although this belief is widely supported by the research of many scholars, there are relatively few empirical studies of the family planning knowledge, attitudes and practices of African men.

In contrast, as a result of such international efforts as the World Fertility Surveys (WFS) and the Demographic and Health Surveys (DHS), there are a fair number of large, comparable, nationally representative surveys on the fertility attitudes and behaviors of African women. Although women are the best sources of information on actual fertility and its proximate determinants, a thorough understanding of the social and cultural determinants of fertility, especially in patriarchal societies, requires that studies of men also be undertaken.

Most recent studies of men's perspectives on fertility have been based on analyses of data from selected populations, often those of single cities. Until such projects as the WFS and DHS include males in their country surveys, results from the smaller studies will continue to provide essential information both to scholars interested in the determinants of fertility in Africa and to policymakers and program officials interested in effective interventions to promote contraceptive use.

The traditional African pattern of male involvement in fertility decision-making is clearly reflected in existing studies of men's influence over these matters in Nigeria. In a study carried out among married Nigerian students, one out of every five women who were not using a contraceptive method gave husband's objection as the reason for nonuse.[3] Another study reported that men fear their wives' use of contraceptives will undermine their own authority as head of household or encourage their wives to be promiscuous.[4]

However, most of these studies were conducted some time ago, and more recent research throughout Africa, particularly in Nigeria, has shown an increase among both men and women in knowledge about, favorable attitudes toward and ever-use of contraceptives.[5] Some attribute these changes to the severe economic deterioration that has hit Nigeria since the end of the oil-fed boom of the 1970s and early 1980s. Although there is some dispute over the long-term effect of such crisis-led changes on fertility and contraceptive use,[6] public policy in Nigeria has clearly altered dramatically with regard to fertility and contraceptive use during the current economic crisis. Evidence can be found in the very existence of an explicit population policy that has specific targets for fertility reduction, and in the recent development of large public information and service delivery programs designed to increase the use of contraceptives.[7]

In this article, we examine the contraceptive knowledge, attitudes and practices among a sample of men in Ilorin, Nigeria, who are married to women aged 15–49. We are interested specifically in finding answers to the following questions:

- To what extent are married men aware of family planning?
- Do they know of specific methods?
- What are their sources of information and how long ago did they first receive this information?
- Do men use contraceptives? If so, what method do they use and how long ago did they start using it?
- Do men have positive attitudes towards contraception?
- Do they generally discuss family planning with their wives? What are their wives' attitudes toward using contraceptives?
- Do men think they or their wives should have the primary responsibility for deciding about contraceptive use? Which of them do they think should be responsible for using the contraceptives?

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Ilorin, the capital of Nigeria's Kwara State, has a population of approximately 700,000. It became the capital in 1967, when the first 12 states were established in Nigeria (the number of states has since increased to 21). Prior to 1967, Ilorin could have been characterized as a traditional town, with indigenous occupations that included farming, pottery-making, weaving, leather work and embroidery. Substantial population growth accompanied the city's becoming a state capital, and additional opportunities for employment have opened up in federal and state agencies (including a university, a polytechnic and both a general and a teaching hospital) as well as in manufacturing and construction. Many of the people who have filled these new positions in the modern sector are educated men and women from other parts of Nigeria, drawn to Ilorin by job opportunities. Ilorin can now be described as an emerging modern city, with a diverse population.

The availability of contraceptives in Ilorin has also changed in recent years. Modern contraceptives can be obtained at three government clinics and in dozens of private hospitals, chemist shops and drugstores. Most of these sources were unavailable before 1983, when there were only two government clinics providing any extensive service. In addition, in 1986 the Kwara State Ministry of Health, in collaboration with Columbia University in New York, introduced community-based distribution of family planning methods in Ilorin; this made it possible for some market women and traders to sell certain types of contraceptives, including the pill and the condom. Kwara State also sponsored one of Nigeria's first state-wide media campaigns to promote contraceptive use and the idea of having small families.[8]

Data and Methods

The data analyzed in this paper are from a household survey fielded in Ilorin between September 1988 and January 1989 that focused on fertility attitudes and behavior, knowledge and use of contraceptives, and a number of important socioeconomic background characteristics. Separate samples of married women ages 15–49 and men currently married to such women were collected. In 1983, a similar survey of women only was carried out with a sample of wives aged 15–35.[9]

The decision to interview separate samples of men and women was based on practical considerations. Although a survey of couples would have allowed a direct comparison of responses from husbands and wives, such a design could also create problems in a setting as traditional as Ilorin. Kwara State, and Ilorin, are on the border between largely Muslim northern Nigeria and largely Christian southern Nigeria; many aspects of husband-wife relations in Ilorin, especially among the more traditional segments of the population, are similar to those typical in northern Nigeria. For example, the consent of the husband is often required before a woman can participate in a study such as the one we conducted. In this context, a woman might be reluctant to answer questions her husband had already been asked. Thus, the local investigator concluded that the practical difficulties of interviewing husbands and wives of the same families outweighed the analytical benefits.

Table 1. Percentage of men who have knowledge of contraceptives and those who have practiced family planning, by selected socioeconomic and demographic characteristics, Ilorin, Nigeria, 1988

Characteristic	N	Have knowledge	Have practiced
All	**1,022**	**97**	**32**
Education			
None	259	89	6
Primary	194	96	21
Secondary	173	98	33
Postsecondary	395	99	53
Socioeconomic residence			
Low	350	90	8
Medium	438	98	40
High	234	99	50
Occupation*			
None	359	97	23
Traditional	330	92	16
Modern	655	97	40
Religion			
Muslim	482	92	17
Christian	536	98	45
Age-group			
15–24	27	85	7
25–29	120	95	27
30–34	220	94	29
35–39	217	98	36
40–44	189	97	37
45–49	125	97	37
≥50	122	93	25
Type of marriage			
Monogamous	801	96	33
Polygamous	186	94	26
Children ever born			
0–2	329	96	26
3–4	327	97	36
5–6	204	94	35
≥7	158	94	32
Additional child wanted			
Yes	690	95	23
No	265	97	52

*Traditional occupations include farming, various crafts and petty trading. Modern occupations include professional positions as well as manufacturing and service positions.

Note: Numbers of cases in categories do not always add to 1,022 because of missing values for some cases.

Because the last reliable census in Ilorin, and in all of Nigeria, was conducted in 1963, when Ilorin was a very different place, no adequate data to establish a representative sample of the Ilorin population existed. Hence, the sampling frame for the current study was designed to collect data from groups of men and women that represented the socioeconomic range of the population.

Ilorin administrative wards were stratified into three groups, depending on whether they represent a low, medium or high socioeconomic area. The identification of each ward was carried out by the local investigator, in consultation with colleagues from the University of Ilorin who have carried out research studies in the city and were familiar with the characteristics of each ward. One or two wards were selected from each stratum, and random samples of households were drawn from the selected wards. Trained male interviewers administered questionnaires to men married to women aged 15–49 who were not included in the female sample. This article concentrates on the data from a total of 1,022 males.

We emphasize that the resulting sample of men is not representative of the Ilorin population. This limitation, however, does not interfere with analysis of the data to reveal differentials in knowledge and behavior that are likely to characterize the distinct socioeconomic groups living in Ilorin, and we confine our analysis and discussion to those groups. Table 1 presents basic information on knowledge and use of contraceptives for the entire sample and within categories of a number of social and demographic variables; all other results are reported within categories of either area of residence (the variable on which the sample was stratified) or level of education of the respondent (which is highly correlated with residence). If adequate census figures on the distribution of the population by residence should become available, appropriate weights can be applied to each case and overall prevalence levels for the population can be calculated.

Results

The sample of 1,022 married men was fairly evenly divided among the three types of residential areas, and included substantial numbers of men with a secon-

Table 2. Among men with knowledge about family planning, percentage who have heard of specific methods, by education and residence

Method	Education				Socioeconomic residence		
	None	Primary	Secondary	Post-secondary	Low	Medium	High
Pill	43	71	78	84	51	79	82
IUD	24	48	41	54	31	48	53
Injectables	46	66	74	76	52	73	76
Female sterilization	19	43	49	58	26	50	60
Condom	46	73	82	88	55	83	83
Withdrawal	31	55	55	73	36	65	70
Diaphragm	23	36	32	60	26	46	70
Spermicides	21	39	46	66	26	51	66
Male sterilization	17	41	45	57	24	46	60

dary or postsecondary education (Table 1—page 51). We are certain that the distribution of the population of married men in Ilorin differs from the distribution in our sample in that there are proportionally fewer well-educated men in the city and more living in poor areas. Table 1 also presents the distribution of the sample among categories of several other variables that are usually of interest in studies of African fertility.

• *Knowledge and Use of Contraceptives.* The data presented in Table 1 reveal that some knowledge of contraceptive methods is virtually universal among men in Ilorin (97 percent overall). Even among men with no formal education and among those living in the poorest areas of the city, approximately 90 percent reported that they knew of some family planning method. Levels of ever-use of contraceptives are considerably lower, and vary much more by residence and education. Ever-use ranges from six percent among men with no education to 53 percent among those with a postsecondary education, and from eight percent among those living in the poorest areas to 50 percent among those residing in the most affluent areas.

Respondents who said they had some knowledge of contraceptives were asked to indicate which of a list of methods they had heard of, and to report which methods they had used. As Table 2 shows, knowledge of specific methods is much lower among men with little or no education than among those with a postsecondary education. For example, 43 percent of men with no education said they knew of the pill, compared with 84 percent of those with a postsecondary education. Similarly, 24 percent of men with no education said they knew of the IUD, compared with 54 percent of those with a postsecondary education. Across all education groups, the condom was the method most likely to have been heard of; yet less than half (46 percent) of respondents with no education knew about it, compared with 88 percent of those in the highest education group. Sterilization, the diaphragm and spermicides were known by the lowest proportions of men of all levels of education. The pattern of knowledge according to residence is very similar to that according to education.

Most of the respondents (60 percent) reported that they had learned about family planning through radio, television or newspapers (not shown). In addition, except for those men with a postsecondary education, a majority of men reported first learning about family planning within the last five years.

Table 3. Percentage of men reporting that they or their wives have ever used specific methods, by education and residence

Method	Education				Socioeconomic residence		
	None	Primary	Secondary	Post-secondary	Low	Medium	High
Effective female methods*	0	3	4	7	2	6	6
Condom	4	14	26	43	6	30	43
Withdrawal	0	4	9	14	2	10	13
Others	1	3	6	10	1	8	8

*The pill, the IUD, injectables and sterilization.

As is evident from the data in Table 3, ever-use of most methods is low. The most commonly used method is the condom, with only four percent of those with no education and 43 percent of those with a postsecondary education reporting that they had ever used that method. Even among the most educated men, ever-use of all other methods was very low: Fourteen percent of these men had used withdrawal, and seven percent reported that their wives had used the pill, the IUD, injectables or sterilization; 10 percent said they had used some other method. Again, the pattern by residence is similar to that by education.

Although a thorough analysis of male-female differences in contraceptive knowledge, attitudes and practices is beyond the scope of this article, we compared reports of use obtained separately from men and women and found that the overall levels of ever-use do not differ much by gender. However, reports of the use of specific methods differ dramatically between men and women. Of the women sampled, very few reported use of condoms or withdrawal, and the methods most commonly ever used were the pill and the IUD. Since this pattern differs from that of the male respondents, it is unclear which report is more accurate, or whether a complete account of contraceptive use in Ilorin might require analysis of reports from both men and women.

• *Attitudes Toward Family Planning.* Regardless of their education or residence category, the vast majority of the male respondents who have knowledge of family planning said they have a positive attitude toward it (Table 4). However, men living in the poorest areas and having no formal education are considerably less likely than the other respondents to approve.

Large proportions of men in the highest socioeconomic and education categories had discussed family planning with their wives (71 percent and 77 percent, respectively). In contrast, very small proportions in the lowest socioeconomic and education groups had done so (16 percent and 13 percent, respectively). Those men who had discussed contraception with their wives were asked about their wives' attitude toward it; the vast majority of them reported that their wives had a positive attitude, regardless of residence or education.

The men were also asked if they would support their wives' use of contraceptives and whether they themselves would consider using a method in the future. Support for their wives' use of contraceptives ranged from 46 percent among men in the poorest areas to 78 percent among those in the most affluent areas. The pattern of support for wives' use is similar across categories of education. Men were slightly less likely to be willing to use contraceptives themselves in the future. Willingness to be the user varied by residence and education in the same way that support for wives' use varied. Approximately one-third of men in the poorest areas and with no education reported a willingness to use contraceptives in the future, compared with roughly two-thirds of men in the most affluent areas and with the highest levels of education.

To further understand the process through which men, women and couples make decisions about family planning, we asked men who should make the decision about using contraceptives and whether it should be the husband's or the wife's responsibility to use them (Table 5). Very few men, regardless of area of residence or level of education, felt that husbands alone should be the ones to actually use birth control, and between 40 percent and 59 percent of men, across all categories of education and residence, felt that wives alone should be the ones to use contraceptives. The greatest variation in responses appears when we consider those men who thought that both the husband and the wife should use or that neither should use. The proportions favoring joint use were much higher among men living in the most affluent areas and those with a postsecondary education (49 percent and 47 percent, respectively). Very few men in any category of residence or education felt that the wife should be the sole decision-maker. Most men living in the poorest areas, as well as most of those with no formal education, thought the husband should decide (61 percent and 60 percent, respectively). Among men in the most affluent areas and with the highest level of education, the majority believed that the decision should be a joint one (57 percent of each). However, even in these groups, approximately one-third said the decision should be the husband's alone.

- *Communication and Contraceptive Use.* One of the more interesting sets of findings in our analysis concerns the association between discussion of family planning with one's spouse and actual use of contraceptives.

Table 4. Among men with knowledge of contraceptives, percentage reporting various attitudes toward them, by residence and education

Education and residence	N	Have positive attitudes	Discuss with wives	Wives have positive attitudes*	Supports wives' use	Will use themselves
Education						
None	231	51	13	90	39	32
Primary	186	70	42	83	60	51
Secondary	169	80	54	81	73	64
Postsecondary	390	87	77	89	84	70
Socioeconomic residence						
Low	315	52	16	82	46	38
Medium	430	84	66	84	75	66
High	232	85	71	93	78	65

*Only those who had discussed family planning with their wives were asked about wives' attitudes.

The data presented in Table 6 (page 54) show that communication about family planning between husbands and wives is associated with considerably greater use of contraceptives, within all categories of residence and education. For example, 60 percent of men with a postsecondary education who had discussed family planning with their wives reported that their wives were using contraceptives. By contrast, in the same education category, only 10 percent of husbands who had not discussed family planning with their wives reported that their wives were using contraceptives.

Although use is much lower among the wives of men with no formal education, the relative difference between those who talk with their wives about family planning and those who do not is similar: Twenty-seven percent of those who had discussed family planning reported that their wives use a method, compared with only four percent of those who had not discussed family planning. The pattern of results is virtually the same when use and discussion are examined across categories of residence.

One possible interpretation of these results is that differences in use by whether or not family planning is discussed can be explained simply by the fact that those men who talk with their wives are more likely than those who do not to know if their wives are using a method. We examined method-specific patterns of use to determine if methods used by women are reported proportionally more often among couples who discuss family planning. Men who had discussed family planning with

Table 5. Percentage distribution of men with knowledge about contraceptives, by who they believe should use them and who should make the decision to use them, according to residence and education

Education and residence	N	Husband	Wife	Both	Neither	Total
WHO SHOULD USE						
Education						
None	231	5	59	10	2	100
Primary	186	6	53	26	15	100
Secondary	169	8	47	34	11	100
Postsecondary	390	4	44	47	5	100
Socioeconomic residence						
Low	315	6	58	12	24	100
Medium	430	7	49	37	9	100
High	232	4	40	49	6	100
WHO SHOULD DECIDE						
Education						
None	231	60	4	10	27	100
Primary	186	60	4	23	13	100
Secondary	169	46	7	41	6	100
Postsecondary	390	36	6	57	2	100
Socioeconomic residence						
Low	315	61	4	12	21	100
Medium	430	46	6	43	5	100
High	232	33	7	57	3	100

their wives were much more likely to report having used both male-specific and female-specific methods than men who had not discussed family planning with their wives. This leads us to conclude that the differences in level of use between the two groups are accurate and not simply a reflection of whether men are aware of use by their wives.

Summary and Conclusions

The results of our study provide a greater understanding of the determinants of reproductive behavior in Ilorin, and illustrate both the accomplishments of and challenges to a recently enacted Nigerian population policy. Many of these findings are contrary to what one would expect based on the traditional views of the attitudes of African men towards childbearing.

First, our data reveal that the vast majority of men in Ilorin are aware of the concept of fertility regulation, but that a smaller proportion have detailed knowledge of specific methods of contraception. Their knowledge has been acquired fairly recently, usually through radio or television shows. The extensive media campaigns in Ilorin and Kwara State in recent years have clearly reached a large part of the urban audience. However, most of the material presented in these radio and television spots is general. More detailed information is typically provided at health centers and clinics, facilities that focus their services on women and children, and that are rarely visited by men.

Although actual use of contraceptives is still not widespread among men in Ilorin, some men have used certain methods, particularly the condom. However, it is difficult to interpret the demographic significance of reported contraceptive use by men, for several reasons. First, we do not know the extent to which men are fully informed about their wives' use of contraceptives. Reports on husband-wife communication suggest that husbands may not be aware of their wives' contraceptive practice. Furthermore, approximately 18 percent of the men interviewed report having more than one wife. Questions on men's use of contraceptives do not ask if patterns of use are similar with all wives. In all likelihood, contraceptive use is not similar among all wives. Finally, we do not know the extent to which methods are used by married men as part of nonmarital sexual activity. Since the condom is the method most commonly reported by men, it is possible that much of this use is outside marriage.

Table 6. Percentage of men whose wives use contraceptives, by whether or not they have discussed family planning with their wives, according to residence and education

Education and residence	Have discussed		Have not discussed	
	N	% using	N	% using
Education				
None	30	27	195	4
Primary	75	33	106	5
Secondary	86	43	71	6
Postsecondary	289	60	84	10
Socioeconomic residence				
Low	49	22	258	4
Medium	275	56	138	7
High	156	49	61	7

Attitudes toward the use of contraceptives are generally positive, although there is considerable variation by socioeconomic status. One interesting aspect is that men are somewhat more willing to support their wives in using contraceptives than they are to consider using them themselves. Differences in the relative authority and responsibility of men and women are also revealed by the finding that men feel they should have a major role in the decision to limit fertility but that the responsibility for actual use of contraceptives lies predominantly with women. Among men from the less traditional sectors of Ilorin, there is a tendency to believe in sharing both the authority to make decisions and the responsibility for implementing them.

A particularly important set of findings relates to the level of communication between husband and wife and the association between communication and use of family planning. Use is dramatically higher among couples who have discussed family planning with each other, and it may be that couples who do discuss family planning find, to their surprise, that both of them support the use of contraceptives but that neither was aware of the other's positive view. As another study in urban Africa recently found: "The men thought that women were largely ignorant of family planning, generally opposed to it and in need of education. . . . The women said the same thing about men."[10]

These findings have several important implications for population policy in Nigeria. First, it is clear that men in Ilorin are now well aware of the issue of family planning and that ongoing efforts by the federal government of Nigeria and the Kwara State government should explore ways in which more detailed information about specific methods could be conveyed to men. A particularly important group that might benefit from such information would be those men who have already decided that they do not want any more children but who have not yet used contraceptives.

Additionally, future efforts to promote fertility regulation need to consider ways to encourage communication between husbands and wives. Such efforts, especially among the more traditional segments of Ilorin, will not be easy or straightforward; it is likely that women are often not included in many family decisions. Nevertheless, encouraging open communication between husbands and wives ought to be seriously considered as a focus of future population education programs.

Findings from this study also have implications for our understanding of the determinants of fertility in Ilorin and of the prospects for fertility declines in the future. Although the use of contraceptives among men in our study was limited, favorable attitudes toward family planning and a willingness to use contraceptives have clearly emerged, probably recently, among some of the population. These changes in attitudes toward the use of contraceptives are important indicators of potential changes in fertility, even if they are still confined to those segments of the population that are more closely linked with the modern sectors.

Important questions remain. Can we expect to see signs of fertility reduction, especially among the most highly educated and otherwise advantaged segments of the population of Ilorin? How long will it take for positive attitudes to become diffused throughout all segments of the population of Ilorin? An essential factor in the answers to each of these questions is the role of continued efforts on the part of both state and federal governments in Nigeria to achieve the ambitious population goals that the country has set. Since Nigeria contains one-fifth of the population of all of sub-Saharan Africa, close monitoring of fertility trends in that country should interest researchers and program officials alike.

References

1. T. McGinn, A. Bamba and M. Balma, "Male Knowledge, Use and Attitudes Regarding Family Planning in Burkina Faso," *International Family Planning Perspectives*, **15:**84, 1989; and M. A. B. Mustafa and S. O. Mumford, "Male Attitudes Towards Family Planning in Khartoum, Sudan," *Journal of Biosocial Science*, **16:**437, 1984.

2. M. M. Kritz and D. T. Gurak, "Women's Status, Edu-

(Continued on page 64)

Making Vasectomy Services More Acceptable to Men

"The findings suggest that Profamilia and other family planning service providers in Colombia could increase the use of vasectomy by adopting a mixed [male-female] service delivery strategy in midsized clinics."

By Ricardo Vernon, Gabriel Ojeda and Ana Vega

Summary
The results of an operations research project that tested two models of vasectomy service delivery in Colombia show that although clinics serving only males performed a higher monthly average of vasectomies than did clinics serving men in a mixed male-female context (12 vs. nine), that difference was not statistically significant. In both types of experimental clinics, specially trained personnel offered vasectomies and other male services that were advertised and promoted; as a result, those clinics performed an average of almost twice as many vasectomies per month as did control clinics that had a traditional female orientation (10 vs. five). The number of vasectomies performed during the project increased by nearly 120 percent in the experimental clinics and by 59 percent in the control clinics. Contrary to expectations, clients of the exclusively male clinics were no more satisfied with the services they received or with their vasectomy than were clients of the mixed clinics or the control clinics.

Introduction

According to data from the 1986 Colombian Demographic and Health Survey, 65 percent of currently married Colombian women aged 15–49 use some form of contraceptive protection.[1] The most widely used method is female sterilization, relied on by 18 percent of women in union. Only 0.4 percent of married women of reproductive age are protected by their partner's vasectomy.

The low prevalence of vasectomy may be partly explained by the lack of awareness of the method among the Colombian population. While most contraceptive methods were recognized by at least 85 percent of women in union, only 51 percent had ever heard of vasectomy. (In contrast, 96 percent of married women knew about female sterilization.) The limited availability of vasectomy services may also explain the low prevalence. Of all the major providers, only the private family planning agency Profamilia (the Colombian affiliate of the International Planned Parenthood Federation) consistently offers vasectomy services.

Profamilia pioneered the first vasectomy program in Latin America in 1970, performing 92 operations that year. The number of vasectomies increased over the following four-year period, peaking at 1,064 ~~in 1975,~~ the year that female sterilization services were first made available at Profamilia clinics.[2] Subsequently, the number of vasectomies decreased steadily, falling to only 480 operations in 1981. This number did not increase appreciably until 1985, when the first male-oriented clinics were opened in Bogotá, the capital, and Medellín, Colombia's second largest city.

Profamilia's male-oriented clinics are markedly different from traditional clinics. They offer facilities completely segregated from those used by women (including classrooms, waiting rooms, operating rooms and recovery rooms); they have separate staffs (i.e., counselors, doctors, nurse's aides, receptionist and doorman); and they provide a wide variety of services for men only (e.g., vasectomies, urological exams, infertility treatment, sexual counseling, general medicine, outpatient surgery and clinical laboratory services). These clinics were promoted through publicity campaigns in the mass media and by field workers.

In 1986, Profamilia managed 39 clinics that provided family planning services and information to clients with limited economic resources. That year, 59,681 female sterilizations and 2,201 vasectomies were performed.[3] Although Profamilia was able to perform 77 percent more vasectomies in 1986 than in 1985, largely because of the newly opened male-oriented clinics in Bogotá and Medellín, vasectomies still represented only 3.6 percent of all sterilizations performed that year. In addition, of the 39 Profamilia clinics, only 23 performed vasectomies in 1986 and, of these, 13 clinics performed less than 14 vasectomies each that year.*

According to evaluations by Beth Atkins and Terrence Jezowski, seven basic elements are important to the success of a vasectomy program: strong leadership by the program director, a focused program design, attention to men's needs, appropriate training strategies, community-based orientation of services, multiple communication strategies and thorough counseling.[4] Although Profamilia emphasizes appropriate training of personnel, and responsible and thorough counseling at all its clinics, the male-oriented clinics have been better able to incorporate the five remaining variables (especially the focused program design, attention to men's needs and communication strategies). Starting up the segregated clinics in Bogotá and Medellín, however, was very costly, making it difficult to consider adapting this strategy to other family plan-

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*Apart from the male-oriented clinics in Bogotá and Medellín (which in 1986 performed 1,163 and 476 vasectomies, respectively), the clinics providing the most vasectomies were those in the cities of Cali (199), Pereira (73) and Palmira (46). These centers were followed by clinics in Bucaramanga, Ibague, Manizales, Neiva and Pasto, which each performed about 23 interventions.

Table 1. Number of procedures performed and percentage difference, by procedure and year, according to type of clinic

Procedure and year	Experimental clinics						Control clinics		
	Mixed hours			Male-only hours					
	Total	Manizales	Ibague	Total	Pasto	Pereira	Total	Neiva	Bucaramanga
Vasectomies									
June 1987–May 1988	105	81	24	123	86	37	80	24	56
June 1988–May 1989	220	165	55	281	110	171	127	46	81
% difference	109.5	103.7	129.2	128.5	98.8	197.3	58.8	91.7	44.6
Female sterilizations									
June 1987–May 1988	2,711	1,953	758	3,380	1,928	1,452	2,528	804	1,724
June 1988–May 1989	3,147	2,133	1,014	3,948	2,082	1,866	2,577	903	1,674
% difference	16.1	9.2	33.8	16.8	8.0	28.5	1.9	12.3	(2.9)
Other male services 1988–1989									
Vasectomy follow-up	168	161	7	200	116	84	7	1	6
Urology	197	75	122	80	11	69	0	0	0
STD treatment	49	13	36	55	3	52	0	0	0
Other visits	40	3	37	37	5	32	0	0	0
Ambulatory surgery	55	10	45	14	1	13	0	0	0

ning clinics. Thus, to design a cost-effective strategy to increase vasectomy use in Colombia, Profamilia conducted an operations research project to test two different approaches to providing male-oriented services that would not entail the expensive process of building segregated male centers. Primary questions were: To what degree is it necessary to separate men's and women's services, and can special promotional campaigns attract as many vasectomy clients as are attracted by the separation of services?

The Project

The observation period for the project, which compared the performance of two different experimental environments with a control environment, was from June 1988 through May 1989. The experimental strategies offered vasectomies and a variety of services for men through either sharing the clinic premises concurrently with women clients (two clinics) or establishing special hours at a traditional clinic for men only (one clinic) and establishing completely separate premises for men only (one clinic). Each of the four experimental clinics hired staff expressly to provide the men's services: a urologist for 15 hours a week, a full-time counselor and a full-time nurse's aide. During the hours that the staff urologist was not on duty, each clinic's counselor was engaged in community information, education and communication activities such as leaflet distribution and talks at workplaces, while the nurse's aide remained in the clinic to provide information to any client who was interested in male-oriented services.

In addition to vasectomies, the experimental clinics offered male-oriented services such as treatment of sexually transmitted diseases, general medical services, urology services and minor ambulatory surgery. In all four clinic cities, male-oriented services were launched with the support of a five-month mass-media campaign that included radio (14,080 spots), the press (60 newspaper advertisements),* the distribution of leaflets and brochures, talks at workplaces (1,045 sessions attended by 33,254 people) as well as household visits by counselors from the experimental clinics.

The strategy of concurrent male-female hours was followed in Profamilia's clinics in Ibague and Manizales. The same facilities in the traditional female-oriented clinics—i.e., waiting rooms, counseling areas, and operating and recovery rooms—were used by clients of both sexes, and general male services were offered during the same hours as the traditional female services. Separate surgery hours for men were set for a given day of the week, usually Friday or Saturday.

In the male-only environment, established in clinics in Pasto and Pereira, special hours were proposed during which men would receive services from the designated hour until closing, thus achieving an exclusively male atmosphere without buying or constructing separate facilities. However, Profamilia later obtained funding to remodel the Pereira clinic, allowing separate premises for men to be built. Thus, two different strategies for service delivery in a masculine context were tested: In Pasto, separate afternoon hours with a separate staff were scheduled for men only, Monday through Saturday; in Pereira, an entirely separate clinic for men was established. However, the Pereira clinic was unable to locate and hire a urologist until nine months after the project began. During this interim period, the director of the women's clinic in Pereira performed vasectomy and general medicine services, but no other male services were provided.

The two clinics selected as controls were Profamilia's centers in Neiva and Bucaramanga; these had performed roughly the same number of vasectomies over the previous year as the experimental clinics and served cities of approximately the same size. The control clinics did not hire any additional personnel and did not offer any special male-oriented services other than vasectomy, which was provided by the clinic directors. Also, there were no mass-media campaigns to promote vasectomy in the control-group cities.

To explore the levels of satisfaction with the clinic personnel and the different service delivery models, all male clients at the project clinics were asked to complete a survey questionnaire after they received care. Vasectomy patients also responded to a second method satisfaction questionnaire administered at follow-up.†

The operations research tested the following hypotheses: Among the experimental clinics, there will be a greater increase in vasectomies (and more men will receive other services) in the male-only environment than in the environment of mixed male-female hours; vasectomies will increase more in the experimental clinics than in the control clinics as a result of promotion in the mass media and the provision of additional male-oriented services; the number of female sterilizations will not be affected appreciably by the existence of male-oriented services; the social and demographic characteristics of vasectomy patients will change significantly in cities where promotional campaigns are launched and remain basically the same where they are not; and the clients of male-only clinics will be more satisfied with their vasectomy and other services than clients of the mixed clinics.

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*The newspaper ads ran three times a month for five months in one local paper in each city. Four different radio spots were broadcast Monday through Friday, 10 times a day, on four local radio stations in each of the cities.

†The project also involved focus groups held among vasectomy acceptors in the Profamilia clinics of Pasto, Manizales and Pereira. Readers interested in the results of these sessions may contact the authors.

Results

There were no significant differences between experimental and control clinics in the social and demographic characteristics of vasectomy acceptors, according to clinical history data. Both before and during the project period, the mean age of vasectomy patients in the experimental clinics was approximately 36 years; they had 3.4 living children and had had roughly 7.5 years of schooling. Acceptors in the control clinics had a slightly higher number of living children (3.8) and had completed slightly fewer years of education (7.2).

Table 1 presents the number of procedures (vasectomies, female sterilizations and other male services) provided annually at each of the six project clinics, both before and during the project. The separate male clinic in Pereira performed the most vasectomies during the project period (171), even though it did not have a urologist for the first nine months. Except for Ibague, each of the experimental clinics performed more than 100 vasectomies.

Compared with the number performed in the 12 months before the project, vasectomies in the male-only clinics increased by 129 percent while those in the mixed clinics increased by 110 percent. Vasectomies increased by 120 percent overall in the four experimental clinics, and by 59 percent in the control clinics.*

Given that couples can elect either vasectomy or female sterilization as permanent contraceptive methods, Profamilia was interested in determining whether the vasectomy advertising campaign might lead to fewer female procedures as a result of the substitution by vasectomy. As the table shows, however, female sterilization increased by 17 percent in the experimental clinics and by two percent in the control clinics.

Even though the male-only clinics achieved a greater monthly average of vasectomies than the mixed clinics (12 vs. nine), as well as a greater monthly increase in vasectomies (seven vs. five), these differences were not statistically significant. The clinics in both experimental contexts provided roughly the same number of vasectomy follow-ups (7–8). In fact, only the monthly average of other male services, which were fewer in the male-only than in the mixed clinics, differed significantly (seven vs. 12, $p<.05$), but this result is not valid because, as mentioned earlier, the Pereira clinic lacked a urologist during the first nine months of the project. Except for the increase in vasectomies, the productivity of the experimental clinics was disappointing; in all, they provided only a monthly average of 17 other services (of which 7.5 were vasectomy follow-ups) and 1.4 outpatient surgical procedures (such as urological ones).

Compared with the two controls, the four experimental clinics performed twice as many vasectomies per month (10 vs. five, $p<.01$). Similarly, while the experimental clinics increased their monthly average by six during the project period, only two more operations per month were performed in the control clinics during the same period, a statistically significant difference ($p<.01$). In addition, the monthly increase in female sterilizations was also greater in the experimental clinics than in the controls (21 vs. two, $p<.05$).

Among clients who completed questionnaires after receiving care, there were no statistically significant differences in satisfaction ratings between the different service delivery models. Overall, when clients were asked to rate their clinic's services on a scale of zero to 10, they gave scores averaging from 9.4 to 9.9. The high ratings seem to be exceptional because the endpoint of the scale was labeled as "excellent, could not be better." Nearly all clients said they would return to the Profamilia clinics if they needed services, and that they would recommend the clinics to their friends.

Responses to other survey items show that almost 100 percent of the respondents thought the attention provided by the different employees (receptionist, counselor, physician and nurse) had been good or very good. Some 95 percent thought that the clinic's facilities were comfortable, pleasant and clean. The service schedules seem to have been appropriate, since approximately 76 percent of clients said that the clinic hours were convenient and another 13 percent reported that it had been neither easy nor hard to make the clinic's hours. Less than seven percent considered the services expensive or very expensive.

There were substantial differences, however, in the vasectomy counseling given to acceptors and the counseling given to clients who came for other male services: Although all vasectomy clients reported having been informed about the operation and only around 10 percent said they still had some questions about the method, just 40 percent of those who came for other services in the male-only clinics reported having been informed about vasectomy and 46 percent said they had questions about it. Finally, there was a significant difference among clinic clients in their preferences about the composition of the waiting room. While about half of all respondents said they were indifferent, about one-third of clients in the male-only clinics said they preferred to have only men in the waiting room, compared with 19 percent or less of clients in the clinics with mixed hours and in the control clinics.

The second questionnaire, administered to vasectomy patients at their follow-up visit—two to nine months after surgery—included items on the first source of knowledge about the method, the contraceptive decision-making process and the reasons for choosing vasectomy over other methods. Since most patients did not return for their spermograms, they were interviewed at their workplaces and homes; altogether, 49 percent of vasectomy patients from the six project clinics were surveyed.

The results show that clients usually learned about the method through a traditional interpersonal source, most commonly from friends (28 percent), their wives (19 percent) or other relatives (eight percent). However, family planning program personnel and the mass media were also important sources of information: More than 22 percent of clients in the experimental clinics mentioned the radio as one of the first sources, compared with less than four percent in the control clinics. In both experimental and control clinics, 21 percent of vasectomy patients mentioned Profamilia personnel as their initial source of knowledge for the method.

When asked whom they had discussed their vasectomy with before deciding to have one, nearly 90 percent mentioned their wives, 40 percent Profamilia personnel, 14 percent friends, 13 percent other medical or paramedical sources and 10 percent relatives. Even though there are relatively few vasectomized men in Colombia, they were an important source of knowledge (11 percent) about the op-

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*An analysis of four nonproject clinics similar in size and resources to the two controls showed that vasectomies had increased over the previous year by 52 percent in those clinics as well. In each of the three years preceding the project, vasectomies had been increasing annually (by 36 percent, 66 percent and 36 percent, respectively), and the increase in the control clinics seemed to be part of a general trend in Profamilia's vasectomy activities. However, an interview with the Neiva clinic director revealed that the client satisfaction and personnel surveys administered in the control clinics were interpreted as demonstration of Profamilia's interest in promoting the method. The director therefore increased the scope of her vasectomy program by arranging a referral system for Profamilia clients with a local urologist at a discount. Thus, the surveys probably did bias the results of the control group somewhat. Still, the experience also confirms the importance of strong program leadership in promoting vasectomy.

Table 2. Results of questionnaire completed by vasectomy patients at follow-up visit, by item, according to type of clinic

Item	Total (N=306)	Type of clinic		
		Experimental		Control
		Mixed hours (N=121)	Male-only hours (N=104)	(N=81)
Average service satisfaction score (0 to 10 scale)*	9.7	9.8	9.6	9.6
Average vasectomy satisfaction score (0 to 10 scale)**	9.2	9.4	8.8	9.5
Quality of sexual relations after vasectomy†				
Better	42.2	40.8	44.1	41.9
The same	57.4	59.2	54.9	58.1
Worse	0.3	0.0	1.0	0.0
% who had recommended vasectomy to friends	74.3	78.9	72.3	69.4
% who would recommend vasectomy in the future	95.0	95.7	93.9	95.6
% who regret having had the vasectomy	1.4	0.0	2.9	1.4

*Indicates a significant difference of $p<.05$ among clinics.

**Indicates a significant difference of $p<.01$ among clinics.

†Significance tested by chi-square; all other tests for significance are by analysis of variance.

eration for men who were considering having one.

About 50 percent of vasectomy clients said they had deliberated for two months or less before deciding on the operation. Although nearly one-fourth reported that it had been mostly their own decision, over half said their wives had influenced their decision most. Eighteen percent mentioned Profamilia personnel as having influenced their decision most, which indicates that Profamilia's counseling can be very effective. Finally, the importance of the role that other satisfied vasectomy clients play in the decision-making process is demonstrated by the fact that nearly six percent of clients cited other vasectomized men as having influenced their decision most. Furthermore, 64 percent of acceptors reported knowing at least one other man who had had a vasectomy.

At the time clients requested a vasectomy, a larger proportion of those in the control clinics (65 percent) were using a contraceptive than were those in either of the two types of experimental clinics (51 percent at the male-only clinics and 57 percent at the mixed clinics). Furthermore, the vasectomy clients in the experimental clinics were less likely to have been using methods that require active male participation, such as the condom, withdrawal or periodic abstinence, suggesting that the mass media campaigns probably attracted men who were ambivalent about taking responsibility for planning their families. Finally, compared with vasectomy clients, users of the other male services were much younger (mean age of 29 years), and because they were also more likely to be single, less than half of these men could be considered to be potential vasectomy clients in the near future. (While nearly 50 percent of users of other male services were single, all vasectomy clients were either married or in union.)

About 40 percent of the respondents had not considered female sterilization as an alternative contraceptive method; this indicates that vasectomies do not necessarily substitute for female procedures. When female sterilization was considered, the reasons most frequently mentioned for choosing vasectomy were that the operation was simpler and safer (each mentioned by 39 percent of respondents). Other reasons given were concern for the wife's health (15 percent), compliance with her wishes (12 percent) and acknowledgment that it is important that men participate in family planning (nine percent), suggesting that "love" or "concern" for wives could be a good selling point for an advertising campaign. When asked why they preferred a permanent method over temporary methods such as the pill, the IUD or the condom, 77 percent of respondents said they did not want more children; 37 percent said that temporary protection was not as reliable; 16 percent cited undesirable side effects of temporary methods; and 21 percent mentioned other health reasons.

Table 2 shows that vasectomy clients were very satisfied both with the service provided and with the method, regardless of clinic environment. On a scale of zero to 10, respondents had an average clinic satisfaction score of 9.7. Clients of the mixed clinics were more satisfied with the pre-operation services (score of 9.8) than were clients in the male-context clinics (9.4) or those attending the controls (9.2). Acceptors rated their satisfaction with the method an average of 9.2. Although it appears on the surface that the male-only clients were least satisfied with their vasectomy (average score of only 8.8), there were two unsuccessful vasectomies at one of these clinics and both patients rated the method a zero, lowering the average score for the group as a whole.

As shown in the table, 42 percent of all respondents said their sexual relations had improved after the vasectomy and 57 percent said they had remained the same. Approximately 74 percent of vasectomy clients had already recommended the operation to their friends and 95 percent said they would do so in the future. Only 1.4 percent overall regretted having been vasectomized—2.9 percent in the male-only clinics and 1.4 percent in the control clinics but none in the clinics with mixed hours. The proportion reporting side effects (most commonly swelling and pain) was also higher in the male-only and control clinics (18 percent and 16 percent, not shown) than in the mixed clinics (12 percent). Apart from the two vasectomy failures indicated earlier, the most serious complaint was impotence, mentioned by one man who, understandably, also gave the method a very low rating and regretted having had the operation.

Table 3 presents the results of a cost-effectiveness analysis of the four experimental clinics. (A comparison with the control clinics is not possible since their accounting reports did not separate out vasectomy costs.) Although the male-only clinics had smaller revenues than the mixed-hours clinics, the former performed a greater number of vasectomies, resulting in a better cost-effectiveness ratio—$9.20 per couple-year of protection (CYP) vs. $10.72 per CYP. However, the cost-effectiveness ratios of both strategies were nearly four times the 1988 cost per CYP for Profamilia's surgical contraception programs in general ($2.68) and three times that of Profamilia's separate male clinics ($3.82).

Table 3. Calculation of cost-effectiveness ratios per couple-years of protection (CYP), in U.S. dollars,* by experimental clinic, June 1988–May 1989

Calculation factors	Mixed clinic hours			Male-only clinic hours		
	Total	Manizales	Ibague	Total	Pasto	Pereira
No. of vasectomies	220	165	55	281	110	171
CYP	2,751	2,063	688	3,513	1,375	2,138
Revenues	4,170	1,786	2,384	3,612	1,699	1,913
Costs	33,650	15,353	18,297	35,930	17,339	18,591
Wages & benefits	16,962	7,696	9,266	18,436	8,991	9,445
Travel & per diem	451	144	307	696	653	43
Publicity	13,119	6,355	6,764	12,597	6,450	6,147
Other expenses†	3,118	1,158	1,960	4,201	1,245	2,956
Net cost	29,480	13,567	15,913	32,318	15,640	16,678
Cost-effectiveness per CYP	10.72	6.58	23.13	9.20	11.37	7.80

*The average exchange rate during the project period was 338 Colombian pesos to one U.S. dollar.

†Includes rent, utilities, other services, maintenance, equipment and supplies.

Discussion

Both of the experimental service delivery environments achieved similar cost-effectiveness ratios, which were about four times less cost-effective than Profamilia's programs of surgical contraception in general. There are three main factors that explain this. First, it is usual for new programs and clinics to have a low cost-effectiveness ratio during the first years of service delivery.* Second, the project overestimated the amount of urologists' time needed: All of the experimental clinics provided services six days a week and the urologists attended an average of only 0.8 patients daily, performing just 2.6 surgical procedures (2.3 vasectomies and 0.3 other out-patient surgeries) at each weekly operating session. Personnel costs could have been reduced by approximately one-third without this miscalculation. After the first year of the project, Profamilia decided to start paying urologists on a per-case basis, which should help avoid this problem in the future.

Finally, publicity costs accounted for over one-third of all costs. Although the full publicity costs were charged to the first year of operations, these first-time costs to launch new services actually should be spread over a longer period of time. The results obtained in the first six months after the project ended confirm the continuing effects of the publicity: The four experimental clinics increased the number of vasectomies by 15 percent (compared to the first six months of project activities); there was a decrease of eight percent in the two control clinics. Taking into account these three factors and the increase in demand for services during the first year of the project, Profamilia could expect to achieve a cost-effectiveness of about $5 per CYP during the second year of operation of the experimental clinics.

The project results do not support the first hypothesis that clinics with male-only hours would provide significantly more vasectomies than the clinics serving men and women concurrently. However, the results confirm the second hypothesis: Clinics that offered a variety of male services and conducted strong promotional campaigns performed almost twice as many vasectomies as clinics that continued to deliver vasectomy services under the traditional Profamilia model.

Two main factors appear to account for the large increase in the number of vasectomy clients at the experimental clinics—the availability of program-specific personnel and the strong promotional effort. The publicity campaigns probably increased vasectomy demand by raising public awareness of the method and by strengthening its legitimacy as a contraceptive option in the community. As new clients arrive at a clinic, specialized personnel are able to address their main concerns more specifically; staff can also promote vasectomy more intensively in their community as interest in the operation grows. On the other hand, the delivery of a whole range of other services for men did not directly increase the acceptability of vasectomy services, at least in the short term, because a large proportion of these users were either single, childless or under age 30 and therefore not in immediate need of a vasectomy.

Regarding the third hypothesis, the vasectomy promotion campaign in the experimental clinics did not seem to have a negative effect on the number of female sterilizations. In fact, the increase in female sterilization at the experimental clinics was almost identical to the nationwide increase that occurred in Profamilia's clinics from 1987 to 1988 (16 percent). This increase was not reflected in the control clinics, however, largely because of the poor performance in Bucaramanga (in which female sterilizations declined during the project period).

The social and demographic characteristics of vasectomy clients did not shift appreciably as a result of the media campaigns, disproving the fourth hypothesis. Karen Foreit and her colleagues found that a magazine advertising campaign in São Paulo, Brazil, seemed to attract a different segment of the public: New vasectomy clients who responded to the ads were older, had fewer children and had higher levels of education than those referred by traditional interpersonal sources.[5] The campaigns in this project, however, seemed to have enlarged the existing pool of vasectomy acceptors without attracting new types of candidates.

Finally, contrary to the fifth hypothesis, clients of the male-only clinics were not more satisfied with the service or with their vasectomy than were clients of either the experimental mixed clinics or control clinics. In fact, the evidence indicates that whenever small differences were found, they had nothing to do with type of environment: Users of the mixed clinics were the most satisfied clients, basically because there were no vasectomy failures in this group. Furthermore, over half of the vasectomy clients reported being indifferent to the idea of sharing the clinic premises with women and over 20 percent actually preferred sharing them.

Conclusions

The results of our operations research affirm that when program administrators take an active role in addressing men's needs, rather than simply making vasectomy services available, men will respond and more vasectomies will be requested. The findings suggest that Profamilia and other family planning service providers in Colombia could increase the use of vasectomy by adopting a mixed service delivery strategy in midsized clinics. Even though the male-only clinics continued to perform a larger number of vasectomies than the mixed clinics six months after the project ended, the difference was not large enough to justify segregated facilities or hours for men's services when large expenses are involved (e.g., for building separate male clinics) or when providing adequate services to women becomes difficult (e.g., limited hours due to a segregated schedule).

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*For example, the 13 clinics that Profamilia opened between 1985 and 1987 improved their cost-effectiveness from $6.67 per CYP in 1987 to $4.83 in 1988, and the two clinics that started operations in early 1987 increased their self-sufficiency levels (the proportion of total expenditures in a given year that come from the sale of the clinic's services and products) by five times in 1988. (Source: Handout from the 1989 annual meeting of medical directors of Profamilia, Pereira, April 6–8, 1989.)

Under the mixed environment, traditional female-oriented family planning clinics could hire specialized personnel to provide a variety of male-oriented services during the regular clinic hours. Because vasectomy is still not well-known in Colombia and in most other developing countries, strong mass-media campaigns would be essential to generate demand for the clinics' vasectomy and other male services. In addition, a full-time counselor and a part-time nurse's aide should be hired to provide information to potential clients and conduct informational activities in the community. We also recommend that, in addition to the spermogram follow-up visit, the counselor always make a follow-up visit to vasectomy acceptors after their operation; these visits have a strong impact on the client's satisfaction with services, and satisfied clients are an important source of referral for new vasectomy clients.

An alternative strategy that Profamilia and other organizations may choose to test in Colombia is to hire only a full-time counselor, conduct strong vasectomy advertising campaigns in the mass media and use the existing medical personnel of female-oriented clinics to provide vasectomies but no other male services. Although similar endeavors have not been very successful in the past, the situation in Colombia would now seem to favor this strategy. Profamilia personnel expect the importance of vasectomy as a family planning method in Colombia to steadily increase. In addition, the public's awareness of vasectomy and its advantages over female sterilization, although still low, has increased substantially in the last few years.

In fact, the results of this project may be partly attributable to the stage in which the vasectomy diffusion process finds itself in Colombia. Thus, the findings cannot yet be generalized to other societies. As mentioned earlier, Profamilia made large gains in promoting vasectomy when it started the two male clinics in Bogotá and Medellín in 1985; using the completely segregated approach of these clinics might be successful in conservative cultures where vasectomy remains an unknown and little-requested method.

Finally, because vasectomy seems to appeal to men who show a special concern for their wives, we recommend that this theme be used in vasectomy promotion campaigns. Profamilia can also advertise new vasectomy techniques that have recently been introduced, such as the no-scalpel vasectomy, which may further increase the response to promotional campaigns and improve the satisfaction of those who undergo the procedure.

References

1. Corporación Centro Regional de Población, Ministerio de Salud and Institute for Resource Development/Westinghouse, *Encuesta de Prevalencia, Demografía y Salud, 1986*, Bogotá, 1987.

2. Profamilia, *Informe de Actividades de Servicio, 1986*, Boletín de Evaluación y Estadística, No. 44, Bogotá, Feb. 1987.

3. Ibid.

4. B. S. Atkins and T. W. Jezowski, "Report on the First International Conference on Vasectomy," *Studies in Family Planning*, **14**:89, 1983.

5. K. G. Foreit, M. P. de Castro and E. D. Franco, "The Impact of Mass Media Advertising on a Voluntary Sterilization Program in Brazil," *Studies in Family Planning*, **20**:107, 1989.

Resumen

Los resultados de un proyecto de investigación operativa en que se ensayaron dos modelos de prestación de servicios de vasectomía en Colombia demostraron que, si bien en las clínicas que atienden sólo a hombres se practicó un promedio mensual de vasectomías mayor que en los centros que atienden también a mujeres (12 contra nueve), la diferencia no es estadísticamente significativa. En ambos tipos de clínicas experimentales había personal especialmente capacitado que ofrecía al hombre servicios de vasectomía y de otro tipo promocionados previamente. Así pues, el promedio mensual de vasectomías efectuadas en dichas clínicas fue casi el doble del de las clínicas de control, tradicionalmente orientadas a atender a la mujer (10 contra cinco). La cantidad de vasectomías que se realizaron durante el proyecto aumentó casi un 120 por ciento en las clínicas experimentales y un 59 por ciento en las de control. Contra todas las expectativas, los pacientes de las clínicas exclusivamente masculinas no quedaron más satisfechos con los servicios que recibieron ni con la intervención que los pacientes de las clínicas mixtas o de control.

Résumé

Les résultats d'un projet de recherche opérationnelle ayant mis à l'épreuve deux modèles de prestation de services de vasectomie en Colombie révèlent que, bien que les cliniques servant uniquement les patients de sexe masculin aient pratiqué chaque mois un nombre moyen de vasectomies plus élevé que ne le faisaient les cliniques servant les patients des deux sexes (12 par rapport à neuf), cette différence n'était pas statistiquement significative. Dans les deux types de cliniques expérimentales, des employés ayant reçu une formation spéciale offraient des vasectomies et autres services masculins qui étaient annoncés et promus; ces cliniques pratiquaient donc presque le double de vasectomies par mois, en moyenne, par rapport aux cliniques-témoins traditionnellement orientées vers les services féminins (10 par rapport à cinq). Le nombre de vasectomies pratiqués durant le projet a augmenté de près de 120 pour cent dans les cliniques expérimentales et de 59 pour cent dans les cliniques-témoins. Contrairement aux résultats attendus, les clients des cliniques exclusivement masculines n'étaient pas plus satisfaits des services reçus ou de la vasectomie que ne l'étaient les clients des cliniques mixtes ou des cliniques-témoins.

The Impact of AIDS on Knowledge and Attitudes About Condoms as a Contraceptive Method in Urban Mexico

"The results from both Mexico and Jamaica indicate that AIDS information campaigns are likely to lead to an increase in knowledge of the condom as a method of AIDS prevention *and* a method of family planning."

By John Stover and Mario Bravo

Summary

Research conducted in urban areas of Mexico indicates that AIDS information programs do not harm the image of the condom as a family planning method. Spontaneous knowledge of the condom both as a method of preventing AIDS and as a contraceptive method increased as a result of a public information campaign and the publicity surrounding it. The two types of knowledge were highly correlated.

Introduction

Condoms are an important part of family planning programs in many countries and the ease of their commercial distribution makes them particularly important in contraceptive social marketing programs. However, the condom's usefulness in disease prevention has given it a poor image in many countries, where it is associated primarily with illicit sex and with disease prevention. Under such circumstances, married couples are often reluctant to use the condom for family planning purposes. Consequently, social marketing programs have devoted effort to improving the condom's image to make it a more acceptable contraceptive method.

The AIDS epidemic has put an even greater emphasis on the role of condoms in the prevention of sexually transmitted diseases. Since there is as yet no cure for AIDS, the epidemic has captured a great deal of public attention. Most countries with a serious AIDS problem are mounting large information programs with the key message that condoms are the best protection for sexually active people who do not have one monogamous partner.

What will be the effect of these AIDS communications programs on the use of the condom for family planning? It is possible that the extensive media campaign associating the condom with AIDS prevention will destroy its image as a family planning method. In this case, anyone purchasing or using a condom would be suspected of having AIDS or having sex with people who are likely to be infected. The introduction of a condom into a primary relationship by a partner would be seen either as an admission that he or she is having sex with other people (who might have AIDS), or as an accusation that the other partner is sexually active outside the relationship.

On the other hand, the tremendous publicity that AIDS information campaigns will generate for condoms could also boost their use for family planning. AIDS campaigns could increase overall awareness of the condom and improve its image by promoting "safe sex."

Given the importance of condoms in many social marketing programs and the need for insight into this issue, we conducted research in several countries on the effects of AIDS information campaigns on condoms. The objective was to determine the impact, either positive or negative, of AIDS information campaigns on knowledge and attitudes about condoms for family planning. The research does not provide a definitive analysis of the relationship but attempts to determine the direction of the influence and an indication of its strength. This article discusses the results of research conducted in urban areas of Mexico.

Background

To confront the spread of AIDS, the Mexican government formed the National Committee for Investigation and Control of AIDS (Comité Nacional para Investigación y Control del SIDA, or CONASIDA) in February of 1986. The committee's work is conducted through three directorates—Health Education, Research and Epidemiology, and Blood Banks. In April 1987, CONASIDA established its National Information Center, a pilot center in Mexico City designed to contact and inform high-risk groups and health professionals. The educational activities of CONASIDA included other activities such as an AIDS information hotline, seminars for health professionals and the preparation of posters and other promotional materials. In addition, the Epidemiology Directorate publishes a monthly bulletin for the health community with the latest facts on AIDS.

The mass media campaign discussed in this article was coordinated by the Directorate for Health Education, which conducted the campaign program in three phases. Phase I, a brief media blitz between May and June of 1987, was stopped short by concerns about poor planning and testing of the material. The only component of this phase that continued beyond June was a pair of short film segments shown in movie theaters.

The second phase involved the production and testing of a television spot developed by a commercial advertising agency. The 30-second animated spot, aired for the first time on November 18, 1987, was directed at myths about AIDS and carried the message that AIDS cannot be transmitted by, for example, kissing, sneezing or using public bathrooms. At first this spot was given heavy exposure, but after objections by the Ministry of Government, it was aired only after 11 p.m.; it ran for three months.

The third phase of the campaign was to begin on December 20, 1987, with the airing of another animated spot, developed by the same agency, on methods of preventing AIDS. This spot had three succinct messages: Ask for disposable syringes whenever you receive an injection; have sexual relations only with your spouse; and use a condom. The spot was delayed

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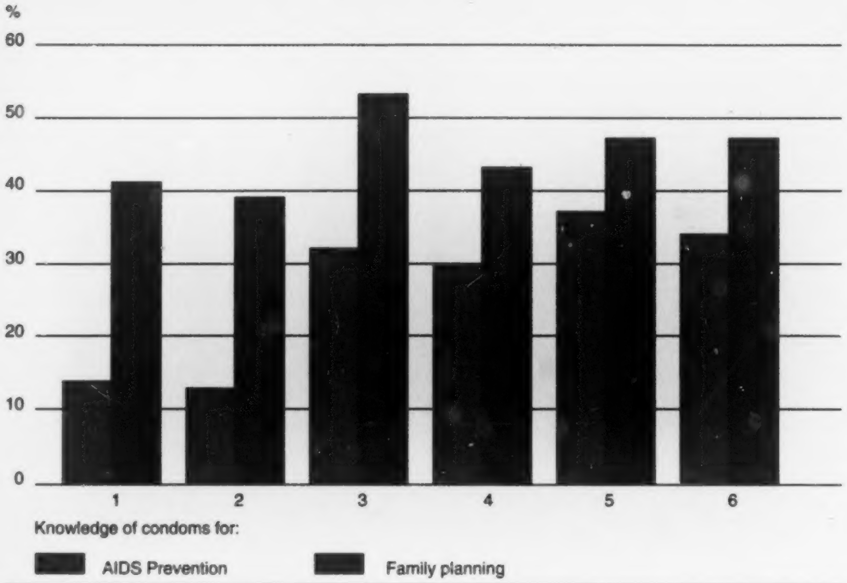
Figure 1. Percentage of respondents who knew about condoms for family planning and for AIDS prevention, by survey round, urban Mexico, 1988



until February 1988 because of objections to the use of the word condom, and it, too, was shown only after 11 p.m. for three months.

At the same time that these television spots were being aired, the local press carried a number of stories on AIDS and the information campaign. Many articles questioned why the campaign was not more visible.

In early April 1988, the Ministry of Health announced the immediate launching of a massive campaign that would focus on methods of preventing AIDS transmission. This announcement sparked a strong response by conservative groups, who accused the government of promoting "free sex" and acting against "good manners, social values and traditions." These groups placed ads in nearly every newspaper calling on the government to stop the campaign and accusing it of inundating schools and public places with condoms. As a result, the new government campaign was canceled. On July 17, 1988 as a separate activity, a National AIDS Day took place, coordinated with articles and interviews in the press; public figures talked about the need for open discussion of the problem.

Methodology

Continuous Omnibus Consumer Studies (Estudios Continuos de Consumidores Omnibus, or ECCO) is a Mexican affiliate of the Gallup Organization that conducts monthly omnibus surveys to collect standard demographic and economic information. Organizations can arrange with ECCO to have a particular question or module of questions inserted into the survey. The organization then receives the responses to their questions, along with the results from the standard demographic and economic items. Using the omnibus survey in this way for social research can be cost-effective when the number of questions is small.

On six different occasions between February and October 1988, a module of five questions concerning attitudes toward and knowledge of condoms was added to the monthly omnibus survey. The surveys coincided with the latter phases of the AIDS information campaign mounted by CONASIDA. The intent was to compare the change in attitudes toward condoms as the AIDS campaign progressed.

Every 1–2 months, the Mexican omnibus survey draws a random probability sample from the population aged 15–60 living in the 36 largest cities in the country. The completed sample size for each survey is 1,300 males and 1,300 females. With this sample size, the survey findings should be accurate to within plus or minus two percentage points. Respondents were contacted and interviewed in their homes. For this analysis, we weighted the sample by socioeconomic group and geographic area to produce a representative sample of urban Mexico.

Our analysis examines the results of six consecutive omnibus survey rounds. Unfortunately, the first survey to include the condom module was not fielded until February, after the first of the two television spots had already aired. However, the six survey waves did cover a period of nine months (the first one occurred before the airing of the second television spot) and included the month of April, when the campaign was especially strong.

The module on attitudes toward and knowledge of condoms consisted of five items. Respondents were asked to name the methods of contraception that they knew; to list the ways of protecting oneself from contracting AIDS; to give their opinions about using condoms for family planning; to indicate whether they would use a condom if they were to use a contraceptive in the near future; and to explain why they would not use a condom, if they so answered.

The responses to these questions were all unprompted; that is, respondents were not given a list of possible answers. We used spontaneous responses to get a truer picture of the knowledge that may affect the participants' behavior.

We also performed a correlation analysis to determine the degree to which knowledge about condoms for family planning and for AIDS prevention were related.

Findings

Figure 1 diagrams the responses to the first two questions regarding knowledge of the condom as a family planning method and as a method of preventing AIDS. Approximately 40 percent of participants mentioned it as a contraceptive method in the first two rounds of the survey (February 5–24 and March 9–24, respectively). By the third survey wave (April 27–May 23), the proportion jumped almost one-third to 54 percent. And while spontaneous knowledge of the condom as a method dropped slightly, to 43 percent, in the fourth round (July 20–August 18), it rose again and remained constant at 47 percent in the fifth and six rounds (August 22–September 15 and September 22–October 24, respectively).

In response to the second question, the proportion mentioning the condom as a method of preventing AIDS more than doubled, from 13–14 percent in the first two waves of the 1988 omnibus survey to 32 percent by the third. The proportion remained about the same in subsequent rounds. The large increase in knowledge between the second and third rounds may have been related to publicity surrounding the government's announcement to undertake a more vigorous AIDS campaign or to the controversy generated by groups opposing the campaign.

The similarity between patterns of knowledge about the condom as a contraceptive method and as a method of preventing AIDS suggests that AIDS information has a positive, reinforcing effect on knowledge of condoms for family planning. Both types of knowledge were relatively unchanged in the first two waves, increased dramatically in the third wave, and stayed at high levels for the three remaining rounds.

We performed a correlation analysis to show the degree to which the same people expressed knowledge or lack of knowledge of condoms for both purposes. The results are presented below:

Survey	Correlation
1	0.11
2	0.25
3	0.27
4	0.31
5	0.32
6	0.33

The positive correlation, which increased in value with each wave as the AIDS campaign progressed, indicates a reinforcing effect of AIDS messages on knowledge of condom use for family planning. Moreover, each of the correlations was statistically significant at $p<.001$. Thus, increasing knowledge of the condom as a means of preventing AIDS also increases recognition of its use as a family planning method.

The respondents' opinions about condoms were easily classified by us as either favorable or unfavorable. For example, favorable opinions included "condom use is responsible" and "it prevents pregnancy," while unfavorable remarks included "condom use reduces pleasure" and "it is unreliable." The proportion of respondents expressing favorable opinions about condoms for family planning increased from 56 percent in the first round to 67 percent by the third, falling to 61 percent by the last round (not shown). A similar pattern occurs in the percentage who said that protection against sexually transmitted diseases (STDs) added to the positive image of the condom as a contraceptive method.

Respondents expressing unfavorable opinions about condoms for family planning declined slowly, from 20 percent in Wave 1 to 15 percent in Wave 5, but rose to 20 percent again in the last survey wave. Almost no one cited the condom's role in AIDS prevention as contributing to a negative opinion of the method (less than one percent).

At each of the survey waves, over 50 percent of respondents said that they would use the condom in the future if they needed a family planning method (see Figure 2). The proportion increased from 51–56 percent in the first two rounds to 58–67 percent in the remaining four. The proportions who would not use the condom as a method of family planning declined throughout the campaign from a level of 42–44 percent in rounds one and two to 29–32 percent in the last four rounds. As with those who said that the condom's role in preventing AIDS did not create a negative association, when asked why they would not use a condom, almost no one answered because it was only for preventing AIDS (less than one percent).

Discussion and Conclusions

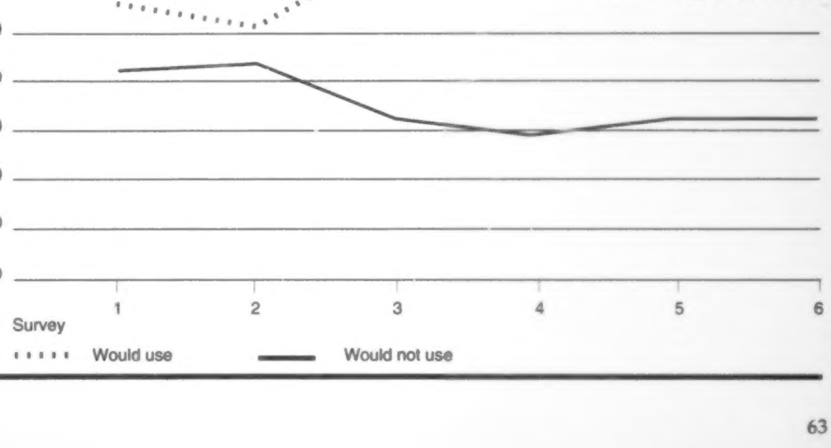
Although only part of the 1987 information campaign dealt with condom use to prevent AIDS, there was a significant increase in knowledge on this subject. According to baseline data from the same questions added to a June 1987 omnibus survey, knowledge about AIDS prevention was far from widespread in Mexico.[1] Only six percent of respondents mentioned condom use when asked how AIDS could be prevented. Respondents more frequently mentioned six other ways of preventing AIDS: avoiding sexual relations with homosexuals (23 percent); avoiding contact with people who have AIDS (11 percent); avoiding sexual contact with prostitutes (nine percent); practicing sexual hygiene (eight percent); avoiding blood transfusions (seven percent); and avoiding all sexual contact (seven percent).

Our study tracked changing attitudes about condoms during an important phase of the Mexican government's public information campaign about AIDS. Earlier research using the same omnibus survey conducted in July 1986[2] and September 1987[3] by the Futures Group and Mexico's Department of Family Planning (Dirección General de Planificación Familiar), which runs the contraceptive social marketing program indicated that the condom was more commonly known as a family planning method: About 37 percent of the respondents in each survey knew about condoms for family planning without prompting.

An increasing awareness of the condom's role in AIDS prevention, as demonstrated by the results of this study, did not seem to lead to a worsening of the condom's image as a family planning method. In fact, the AIDS messages improved knowledge about the condom as a contraceptive method (and possibly its image as well since the proportion saying they would not use one declined at various points over the survey period).

Since the research reported on here was conducted, CONASIDA has carried out four additional AIDS campaigns. Each has stimulated a debate about sexual taboos and deeply held beliefs. After each campaign, CONASIDA received anecdotal reports from condom distributors and producers that sales had increased. Recently, the advertising for some brands has stressed both the themes of family

Figure 2. Percentage of respondents who said they would or would not use condoms if they needed a contraceptive in the near future, by survey round



planning and protection from infection.

Our results generally agree with findings from two other research projects recently undertaken in Jamaica by the Ministry of Health of Jamaica and The Futures Group. A baseline survey of AIDS knowledge and attitudes in Jamaica indicated that the image of the condom as a family planning method was enhanced by its role in AIDS prevention.[4] Focus-group research conducted at the same time found that most participants regarded AIDS protection as a "bonus" when using the condom as a contraceptive.[5] There is evidence, however, that people who already held a negative image of condoms may have had these opinions reinforced.

The results from both Mexico and Jamaica indicate that AIDS information campaigns are likely to lead to an increase in knowledge of the condom as a method of AIDS prevention *and* a method of family planning. It appears unlikely that the introduction of AIDS-specific brands of condoms would hurt the image of other condom brands for family planning, although we did not specifically research this question. Whether AIDS-specific brands are needed in order to increase condom use for AIDS prevention, however, is unclear.

References

1. I. M. Reider, *Resultados del Estudio de Opinión Realizado a Través del Sistema Omnibus—Tema: Síndrome de Inmunodeficiencia-Adquirida*, Estudios Continuos de Consumidores Omnibus (ECCO), Mexico City, July 1987.

2. *Resultados del Estudio Realizado en su Primera Etapa para Evaluar la Categoría de Anticonceptivos*, ECCO, Mexico City, July 1986.

3. *Resultados del Estudio Realizado en su Tercera Etapa para Evaluar la Categoría de Anticonceptivos*, ECCO, Mexico City, Oct. 1987.

4. *A Baseline Survey on AIDS and Sexually Transmitted Diseases*, Market Research Services Limited, Kingston, Jamaica, Aug. 1988.

5. M. Wedderburn, *An Evaluation of AIDS Messages in Jamaica: A Report of Focus Group Findings*, Hope Enterprises, Kingston, Jamaica, Sept. 1988.

Resumen

Investigaciones realizadas en zonas urbanas de México indican que los programas de información sobre el SIDA no perjudican la imagen del preservativo como método de planificación familiar. Gracias a una campaña informativa y a la publicidad que se le dio, aumentó el conocimiento espontáneo del preservativo como método anticonceptivo y de prevención contra el SIDA. Ambos tipos de conocimientos estaban estrechamente relacionados.

Résumé

Les recherches effectués dans les zones urbaines du Mexique révèlent que les programmes d'informations sur le SIDA ne ternissent pas l'image du préservatif comme méthode de planification familiale. La connaissance spontanée du préservatif, comme méthode de prévention du SIDA aussi bien que comme méthode contraceptive, a augmenté sous l'effet d'une campagne d'information publique et de la publicité qui l'a entourée. Les deux types de connaissances étaient en étroite corrélation.

Family Planning Knowledge . . .

(Continued from page 54)

cation and Family Formation in Sub-Saharan Africa," *International Family Planning Perspectives*, **15:**100, 1989.

3. J. O. Ojeifo and B. Singh, "Paternal Health Services: A Missing Link in Family Health Services," presented at the 11th Annual International Health Conference, National Council for International Health, Arlington, Va., June 10–13, 1984.

4. P. O. Awsanya, "Nigeria: Cultural Barriers to Family Planning Among the Yorubas," *Studies in Family Planning*, **1:**13, 1969.

5. G. A. Oni and J. McCarthy, "Contraceptive Knowledge and Practices in Ilorin, Nigeria: 1983–1988," *Studies in Family Planning*, **21:**104, 1990; A. A. Olukoya, "The Changing Attitude and Practice of Men Regarding Family Planning in Lagos, Nigeria," *Public Health*, **99:**349, 1985; and D. Lauro, "Modern Contraceptive Use As a Determinant of Fertility in Africa," paper presented at a meeting of the National Academy of Sciences, Committee on Population, Washington, D.C., Apr. 1989.

6. R. J. Lesthaeghe, "Social Organization, Economic Crises, and the Future of Fertility Control in Africa," in R. J. Lesthaeghe, ed., *Reproduction and Social Organization in Sub-Saharan Africa*, University of California Press, Berkeley, 1989.

7. Federal Republic of Nigeria, *National Policy on Population for Development, Unity, Progress and Self-Reliance*, Federal Ministry of Health, Lagos, 1988.

8. P. T. Piotrow et al., "Mass Media Family Planning Promotion in Three Nigerian Cities," *Studies in Family Planning*, **21:**265, 1990.

9. G. A. Oni, "Effects of Women's Education on Postpartum Practices and Fertility in Urban Nigeria," *Studies in Family Planning*, **16:**349, 1985.

10. T. McGinn, A. Bamba and M. Balma, "Male Knowledge, Use and Attitudes Regarding Family Planning in Burkina Faso," *International Family Planning Perspectives*, **15:**84, 1989.

Resumen

En una encuesta de hogares realizada entre septiembre de 1988 y enero de 1989 en Ilorin, Nigeria, 1.022 hombres informaron sobre sus conocimientos, actitudes y prácticas en materia de anticoncepción. Si bien la muestra no es representativa de la ciudad, los datos sirven para comparar información según el nivel de instrucción y el lugar de residencia por nivel socioeconómico.

Los conocimientos sobre anticonceptivos son prácticamente universales entre estos hombres, siendo el preservativo y la píldora los métodos más conocidos. El preservativo es también el método más generalizado en esta muestra de hombres casados con mujeres de entre 15 y 49 años, aunque menos de la mitad de los hombres de los grupos de mayor instrucción y nivel socioeconómico lo han utilizado alguna vez.

La mayoría de los hombres de todos los niveles de instrucción y áreas de residencia tienen una actitud positiva frente a la planificación familiar. El uso de anticonceptivos, además, está asociado con la comunicación al respecto entre marido y mujer. De los hombres que dijeron haber hablado del tema con su mujer, entre el 22 y el 60 por ciento informaron de que ésta usaba algún método. En el caso de los que manifestaron no haberlo hecho, en cambio, la proporción variaba del cuatro al 10 por ciento.

Résumé

Une enquête effectuée entre septembre 1988 et janvier 1989 auprès de ménages d'Ilorin, au Nigéria, a rendu des données sur les connaissances, les attitudes et les pratiques de 1.022 hommes en matière de contraception. Bien que l'échantillon ne soit pas représentatif de la ville, les données offrent des informations comparées par niveau d'instruction et rang socio-économique (tel que mesuré par zone de résidence).

La connaissance des contraceptifs est pratiquement universelle chez ces hommes, le préservatif et la pilule étant les méthodes les mieux connues. Le préservatif constitue également la méthode utilisée le plus souvent; cependant, moins de la moitié des hommes provenant des groupes les mieux instruits et des classes socio-économiques les plus élevées en ont jamais fait usage.

La plupart des hommes à tous les niveaux d'instruction et de résidence ont des attitudes positives à l'égard de la planification familiale, et l'utilisation des contraceptifs est liée à une communication entre maris et femmes au sujet de la planification familiale. Parmi les hommes déclarant avoir eu ces discussions, 22 à 60 pour cent signalent que leurs épouses utilisent une méthode, par rapport à 4–10 pour cent de ceux qui affirment n'avoir pas discuté de planification familiale avec leurs épouses.

Comment

Fertility Decline and Pronatalist Policy In Singapore

By Sharon M. Lee, Gabriel Alvarez and J. John Palen

Introduction

In an age dominated by global concern over rapid population growth, there is understandably less attention paid to areas where fertility may be declining. Yet the fear of population decline has a long history,[1] and the topic has experienced a revival in recent years as many industrialized nations have become increasingly aware of the potential consequences of long-term low fertility.[2]

Several countries have adopted pronatalist policies in an effort to reverse low fertility. France, West Germany, and the Soviet Union, for example, have instituted fertility incentives—such as financial grants and tax breaks, and more child care services and help for working mothers—to encourage births and slow the trend of declining fertility, while countries such as Romania, under the regime of Nicolae Ceausescu, had severely restricted access to contraceptive and abortion services to promote larger families. To date, most of these efforts have had only limited success in reversing low fertility.

In Singapore, a newly industrialized country, there has been a unique response to low fertility and projected population decline. The country moved from high fertility in the 1960s to below-replacement fertility in the 1980s, leading to a shift by the Singaporean government toward pronatalism.[3] This article discusses the new pronatalist policy—the factors behind it, the primary initiatives and the prospects for success.

Table 1. Singapore's population and growth rate, by year, 1871–2000

Year	Population	Growth rate
1871	97,111	na
1881	137,775	3.6
1891	181,612	2.8
1901	227,592	2.3
1911	303,321	2.9
1921	418,358	3.3
1931	557,745	2.9
1947	938,144	3.3
1957	1,445,929	4.4
1970	2,074,507	2.3
1980	2,413,945	1.5
1990	2,710,819	1.1
2000	2,929.662	0.6

Sources: C. K. Khoo, *Census of Population 1980, Administrative Report*, Department of Statistics, Singapore, 1983, Table 5.1; S. H. Saw, *Demographic Trends in Singapore*, Census Monograph No. 1, Department of Statistics, Singapore, 1981, Tables 1.1 and 5.1.

Note: na=not applicable.

Demography and History

Modern Singapore began as a trading port established by the British East India Company in 1819. The island was initially populated by a few hundred Malays, but the population quickly increased, as shown in Table 1. Prior to World War II, the main factor in population growth was immigration, mostly from China, and to a lesser extent, India and the surrounding Malay archipelago.[4] Restrictions on immigration were introduced in the 1930s and then tightened in the post-war decades; population growth since the 1940s has been primarily the result of an increased birth rate.

The independent Republic of Singapore was established in 1965. The government quickly recognized the potential adverse effect on economic development of a population approaching two million—with an annual population growth rate exceeding three percent in the 1960s—crowded on an island of 224 square miles. A population restriction program was initiated in 1966, with the goals of achieving zero population growth and the norm of a two-child family by 2030.

The Singapore Family Planning and Population Board (SFPPB) was established in 1966, and the government began a vigorous campaign to encourage smaller families. Fertility disincentives included financial deterrents (for example, higher delivery fees for second and later children, paid maternity leave for the first two children only, and no tax breaks for third and subsequent children), as well as a decreased chance of obtaining government-subsidized housing if families had three or more children. (The majority of Singaporeans rely on subsidized housing; it currently provides homes for 85 percent of the island's population, and almost all are low- and middle-income residents). The government-controlled mass media circulated family planning messages, and the Ministry of Education introduced classes on population and family planning into the schools. Family planning services were made easily available, and legislation to provide low-cost abortion and sterilization was enacted in 1970.[5]

Figure 1 (page 66) shows the trend of the declining total fertility rate (TFR) from 6.5 in 1957 to 1.4 in 1988. Singapore's TFR is now among the lowest in the world. The net reproduction rate, estimated at 1.4 in 1969, had dropped to 0.76 in 1985. If recent levels continue, the current generation of Singaporean women will, on average, be replaced by a generation of daughters that is proportionately smaller by about one-fourth. Many factors may have played a role in this population shift, including government programs, industrialization and changes in family structure and social values.[6] In any event, the goals of the population restriction policies and pro-

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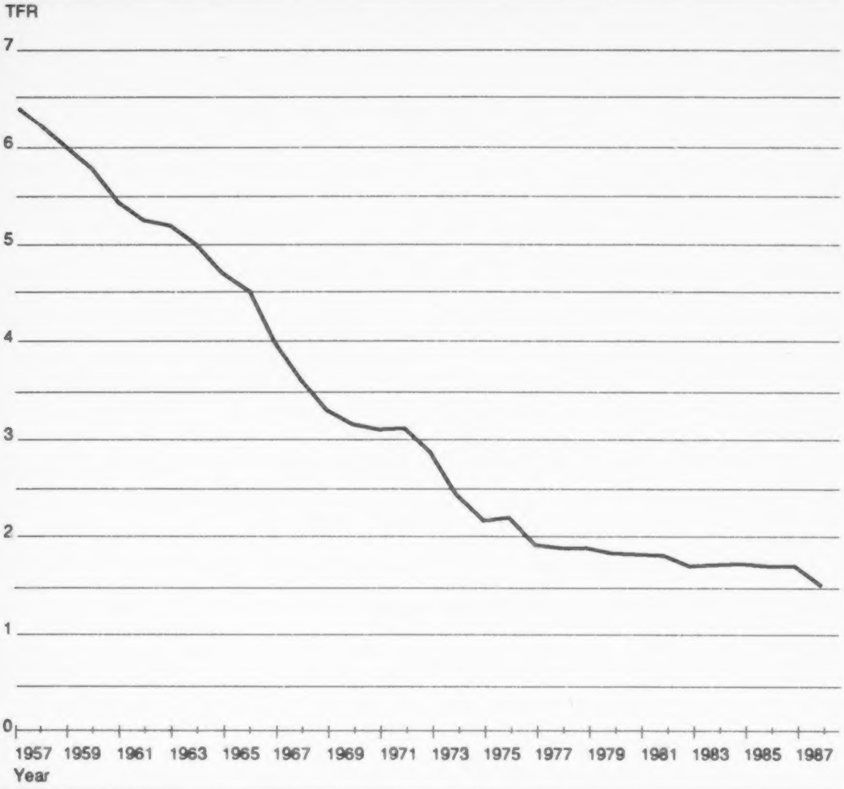
Figure 1. Total fertility rate, Singapore, 1957–1988



grams introduced in the late 1960s have been achieved for over a decade now, and until recently, Singapore had been seen as a role model for government fertility control programs.

The Switch To Pronatalism

The first hint of a change in population policy came on August 14, 1983, in the National Day speech of Prime Minister Lee Kuan Yew. Census data for 1980, he noted, showed that women with little or no formal schooling had an average of 3.5 children, while university-educated women had 1.6 children. In addition, close to 16 percent of female university graduates remained single at 35 years of age.

According to the Prime Minister, such differentials imperiled the country's future because "nature, or what is inherited, is the greater determinant of a person's performance than nurture. . . .If we continue to reproduce ourselves in this lopsided way, we will be unable to maintain present standards. Level of competence will decline. Our economy will falter; administration will suffer; and our society will decline."[7] The Prime Minister's speech assumed that educational attainment was a valid substitute for natural talent, in which case, such educational differentials in fertility would not be eugenically beneficial for Singapore.

While the Prime Minister and other officials did not refer to ethnic differences in fertility in their 1983 speeches, the government's concern with eugenics and population clearly revealed worries about the future ethnic composition of Singapore's population. Immigration by Chinese and Indians in the 1800s and early 1900s resulted in a multiethnic population. The Chinese are now the majority (77 percent of the population), followed by Malays (15 percent), Indians (six percent), and a small population of other and mixed ethnicities.[8] While the Chinese dominate politically, economically, socially and culturally, census data reveal that a below-replacement fertility pattern is found mainly among Chinese women: The Chinese produce 69 percent of births, Indians eight percent, and Malays 19 percent.[9] In addition, more university-educated women are Chinese than are Malay or Indian, and while virtually all Malay and Indian women marry (whether or not they are college educated), Chinese women show lower marital rates, particularly among college graduates.[10]* Thus, the concern over marriage and fertility among educated women was specifically directed at Chinese women.

While controlling population growth was an integral part of the push toward economic development in the 1960s, by the 1980s Singapore was faced with a population that was changing not only in size but in its reproductive patterns. Singaporeans have been delaying marriage, and many are not marrying at all. While the mean age at first marriage for men has remained relatively stable at 28 years from 1957 to 1985, that of women has increased steadily from 23.6 to 25.3 years. Delayed marriage patterns are especially marked in regard to educational attainment; 1985 data show that the mean age among total and first marriages is highest for people with a university education.[11] The inverse relationship between fertility and education is revealed in the latest census data: University-educated women have the lowest mean number of living children, 1.57, compared with 4.37 among women without formal education, 2.34 among women with only primary or elementary schooling, and 1.59 among women with secondary and upper secondary schooling.[12]

Because of their political and economic implications, population changes in Singapore are viewed seriously by the government. An island with no natural resources other than its harbor, Singapore has depended on its own labor force for economic development, which has been spectacular over the last two decades: In 1987, the per capita gross national product was U.S. $7,410, second in Asia only to Japan, and higher than Italy and Spain. On health and other quality-of-life indicators, Singapore has also done well. The 1987 infant mortality rate was 9.3 per 1,000, lower than that of the United States (10.5), the United Kingdom (9.4) and West Germany (9.5), and life expectancy at birth was 73 years.[13] Most Singaporeans live in modern government-subsidized apartments, and the island has extensive highways and a new mass transit system.

The Government's Efforts

Michael S. Teitelbaum and Jay M. Winter suggest that governments can respond to potential population decline in four ways: limiting access to effective family planning, increasing fertility through incentives, increasing immigration and adapting to demographic change rather than trying to influence it.[14] Singapore has chosen an active response by trying to affect fertility through numerous incentives directed at specific groups of women.

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*A growing proportion of Indian and Malay women aged 30–34 are also remaining single. The sources for such a development are unclear, but if this trend continues, the problems of low fertility can only be exacerbated. (See: Singapore Ministry of Health's Population Planning Unit, 1985.)

Since 1983, several policies have been introduced to encourage Singaporeans, especially those with what are considered "desirable" characteristics, to have more children. Numerous shifts in the pronatalist programs have occurred, reflecting the difficulties faced by officials in attempting a complete reversal in population policy.

The first pronatalist program was the "Graduate Mothers Program" introduced in January 1984. The program tried to encourage university-educated women to have more children by offering the women a series of incentives, including giving them priority in choice of schools for their children if they had three or more and tax relief if they were of higher parity.*

The program stemmed directly from the government's equating educational attainment with intelligence. Officials felt that these incentives would encourage highly-educated women "to have a second, if not a third, child. This will go a little way toward correcting the present lopsided pattern of procreation in Singapore which is a cause for concern."[15] The program was directed at educated Singaporean women, who tend to marry men of similar educational backgrounds. The government also wanted to enhance the appeal of women graduates as spouses, given that 16 percent of graduate women remained single, compared with just five percent of graduate men.[16]

The fertility incentive program for highly educated women was accompanied by an antinatalist Sterilization Cash Incentive Scheme directed at poor and less-educated women.[17] If a woman was younger than 30 and had a family income below U.S. $2,750 annually, and if neither she nor her husband had completed high school, her sterilization would be rewarded by a cash grant of about U.S. $5,000 to be used in purchasing a government-subsidized apartment. The cash award was approximately one-third the cost of a three-bedroom apartment and was more than enough to cover the required 20 percent down payment. However, if the operation were ever reversed, the woman would have to return the grant with 10 percent compound interest.

By mid-1985, only 57 couples had signed up for the sterilization program, and only 47 women were sterilized.[18] Despite its limited success, the sterilization program did not meet with notable opposition, which was surprising, given the ethical questions raised by a program targeting poor and less-educated women for sterilization. This suggests that Singaporeans, on the whole, may believe that poor people should not have large families, yet it is unclear whether such a belief has a eugenic or economic basis.

The Graduate Mothers Program turned out to be more controversial than the government had expected; there was especially strong criticism from high school-educated women who resented the benefits extended to a small group of highly educated women.† (According to the 1980 Census, just 1.8 percent of women aged 10 and over were university graduates.) The target group of women graduates was also unenthusiastic about the proposals, judging from letters published in the newspapers.[19] These women resented the government's appeal for their "superior" genes, and were not happy with the intrusion into their personal lives.[20]

It was not surprising when, in March 1985, the Graduate Mothers Program was abruptly terminated, as the Minister of Education, Tony Tan, announced: "The response from graduate mothers would indicate that this premise [incentives would encourage graduate women to have more babies] is unlikely to be true. In view of the anxiety and resentment which the priority scheme has aroused in Singaporeans, both graduate and nongraduate, and as the scheme is not likely in my view to produce the desired results, I see no reason for continuing [it]."[21]

Because a major concern of the government was the low marriage rates of university-educated women, almost all of whom were Chinese, a Social Development Unit (SDU) to facilitate marriage for university-educated women was established in 1984 within the Ministry of Finance. Still in operation, its primary objective is to bring together single university graduates by organizing tea dances, bowling clinics, weekend holiday trips to resorts, computer workshops and even cruises (dubbed "love boat cruises" by Singaporeans). In addition, all unmarried government employees with university degrees are required to attend workshops and seminars on marriage and the family, and there is a computerized matchmaking service run by the SDU to pair couples for dates.

As of 1988, about 40 percent of single graduates (approximately 7,000 members) belonged to the SDU and it claims to have produced nearly 500 marriages since 1984. The unit's deputy director summed up the SDU's activities by saying, "If you want to produce geniuses, you have to get the graduate man to marry a graduate girl."[22]

Despite the failure of its early incentive programs, the Singapore government kept its pronatalist policy. Early in 1987, new fertility incentives (which were continued in 1989) were announced. These incentives were phrased in terms of affordability ("Have Three, or More if You Can Afford It"[23]) and the previous emphasis on educated mothers was dropped. However, it is unclear how different the "new" fertility incentive program was, because the higher incomes of better-educated Singaporeans meant that essentially the same groups remained the targets of pronatalism.

The new incentives also included financial benefits. For example, parents with three children were granted tax rebates of up to U.S. $10,000, spread over a five-year period. Working mothers received a tax rebate equal to 15 percent of earned income—up to a maximum of U.S. $5,000—and tax deductions for the third and fourth children were increased. Delivery fees for children of third and higher parity were subsidized by the government.

In addition to these financial benefits, families with three or more children were awarded priority in school registration and in housing (the wait for government-subsidized housing was cut from an average of two years to two months). The government would also contribute towards child-care costs, and female government employees were given additional maternity leave benefits.[24] A new incentive announced in the 1990 budget offers a U.S. $10,000 tax rebate, valid for seven years, to couples who have a second child before the mother is aged 28. The longer the mother waits to have her second child, the smaller the tax break. This policy was intended to discourage delayed childbearing and bring about higher fertility by rewarding couples who have their families sooner.[25]

*While the Singapore education system is public and schooling is available to all, schools vary in quality and reputation, and the system is highly competitive. Children are "tracked" from age eight, and are tested frequently. The chances of proceeding to a good high school depend on which elementary school one attended; in turn, one's high school is a major determinant of entering a university, which only eight percent of high school graduates are selected to attend. Therefore, having priority in school registration is a decided advantage, because parents can more easily place their children in the better elementary schools.

†The Graduate Mothers Program was later extended to include women who were high school graduates.

Table 2. Projections of total population (in 000s), population younger than 15 (in 000s) and percentage of population aged 59 and older, by three assumptions regarding family size, according to year

Year	2-child family			1.5-child family			1.3-child family		
	Total	<15	≥59	Total	<15	≥59	Total	<15	≥59
1985	2,558	624	7.8	2,558	624	7.8	2,558	624	7.8
1990	2,703	621	8.5	2,691	609	8.6	2,686	604	8.6
1995	2,850	659	9.3	2,809	618	9.5	2,789	[illegible]	9.5
2000	2,987	682	10.5	2,900	595	10.8	2,858	[illegible]	11.0
2005	3,102	681	11.5	2,961	552	12.0	2,896	492	12.3
2010	3,191	660	14.2	3,000	509	15.1	2,911	440	15.5
2015	3,266	642	17.4	3,018	481	18.8	2,905	410	19.6
2020	3,328	643	17.4	3,014	468	23.3	2,873	393	24.4
2025	3,372	660	23.8	2,979	457	26.9	2,807	374	28.5
2030	3,391	671	24.5	2,912	438	28.5	2,708	346	30.6
2035	3,382	669	24.4	2,814	412	29.3	2,577	315	32.0
2040	3,358	659	23.2	2,698	387	28.9	2,429	288	32.1
2045	3,332	651	22.4	2,577	368	28.9	2,275	268	32.7
2050	3,317	654	22.0	2,460	355	29.3	2,125	252	33.7

Source: Based on projections by Saw Swee Hock in "When Couples Have Fewer Than Two," *The Straits Times*, June 15, 1986.

Future Projections

When population policy was first changed in 1983, the official reason was concern with the genetic quality of future generations. By 1987, the reasons for population policy changes had evolved to include concerns about the moral character of Singapore, economic growth, aging of the population, and ethnic balance. Casting pronatalist programs in a moral context, the Prime Minister characterized the advent of oral contraceptives as a catalyst of the decline in the West: "When the pill was discovered, it was supposed to be a blessing for mankind, and we just took the pill in and family planning dispensed the pill. It has led to promiscuity in the West, the total breakdown of all family control over children, and a new kind of society where you shack up with people and have one-parent families."[26]

The move towards encouraging higher fertility could mean changes in the government's growing role in contraception and family planning, including a reconsideration of abortion policies. The number of abortions compared to pregnancies has increased steadily since 1970, when only four percent of pregnancies ended in abortions. By 1985, 36 percent of pregnancies ended in abortion, which is both easily available and affordable (in government hospitals, an abortion costs just U.S. \$2.50[27]). As yet, no decision affecting abortion policy has been made, although it is clearly a potential target of the pronatalist movement in Singapore,[28] and it may be only a matter of time before the availability of abortion is limited.

Because the aging of the population and the implications that imbalances in age groups could have for economic growth and the size of the labor force have been used to bolster pronatalist policy, we have summarized projected changes in population size and age distributions under three fertility assumptions (see Table 2). If the current below-replacement fertility level persists, the population will continue to grow, and will peak early in the next century. The various projections suggest that peak population may range from about three million (assuming below-replacement fertility) to a high of 3.4 million (with fertility at replacement level) in 2030.

The norm in Singapore is now the two-child family; if each couple were to have only two children from now on, the young segment of the population (those below 15 years old) will remain at a relatively stable size. When fertility is below replacement level, there will be at least a 43 percent decrease in this age segment between 1985 and 2050, and a decline in absolute numbers in this group beginning in the 1990s.

The proportion of Singaporeans aged 59 and older is expected to increase from 7.8 percent of the population in 1985 to 10.5 percent in 2000,[29] assuming replacement-level fertility. This older segment of the population will comprise 22 percent of the population by 2050, and even higher proportions of older citizens are expected with below-replacement fertility.[30]

A pronatalist policy is therefore seen as critical in maintaining an adequate Singaporean work force that can support the elderly as well as sustain current levels of economic development. The Singapore government wants to phase out foreign temporary workers by 1992; these workers, mainly from Malaysia, Indonesia and Sri Lanka, numbered over 150,000 in the mid-1980s, accounting for almost 12 percent of the labor force. Foreign workers are tolerated, but the government fears they could become politically and socially disruptive. Thus, economic considerations, combined with concerns over an aging population, strengthen current arguments in favor of pronatalism.

Perhaps the critical factor underlying Singapore's pronatalism, however, is ethnicity. When the alarm over educated women's low fertility was first sounded in 1983, it was clear that ethnicity was a crucial but unexpressed concern. Then, in a speech delivered at the end of 1986, the Prime Minister stated that "the problem" was that the Chinese were not replacing themselves.[31] Since then, officials have addressed the ethnic factor even more directly. When First Deputy Prime Minister Goh Chok Tong announced the new population policy based on affordability in 1987, he said: "The Malays, with a fertility rate of 2.1 over the past decade, have been replacing themselves. The Indian fertility has also tended to be near replacement level, fluctuating between 1.9 and 2.1. But the Chinese fertility rate has been sliding for the past ten years. It is now down to 1.5, and is expected to slip further. So the source of the problem is the Chinese community. They are not replacing themselves."[32]

Thus, while all Singaporean couples are eligible for the tax rebates, making children the country's biggest tax break, the main targets of the fertility incentive programs are the Chinese. Richard Hu, the finance minister, made it clear that delayed childbearing is "particularly pronounced for the higher educated,"[33] so the 1990 proposal to encourage earlier childbearing can be seen as another attempt to persuade the Chinese to have large families.

Reactions to Pronatalism

The government appears confident that increasingly explicit statements regarding ethnicity will not provoke tension, a remarkable attitude given the history of Chinese-Malay racial tension and conflict in Singapore and the proscription of public discussions of "sensitive" racial issues. The present government has had tight control over the country since Singapore emerged from colonization—Lee Kuan Yew, the first Prime Minister of Singapore, stepped down in 1990 and was replaced by his hand-picked successor, Goh Chok Tong. As with all political, economic, and social policy decisions in Singapore, population policies are formulated and implemented "from the top down"; upper-level government officials (particularly the Prime Minister) announce new policies without much prior public debate.

There is little systematic collection of information on Singaporeans' attitudes toward recent shifts in population policies and the programs designed to implement them, other than letters published in the government-controlled press. This information would be helpful in considering the potential effects of the new fertility programs as well as the future of population trends. A purposive sample survey of 399 Singaporean university students, intended to gauge young people's attitudes and potential responses to the new population policies, was conducted in 1983–1984.* Data from the Chinese respondents, who were 93 percent of the sample, are presented here.

About 91 percent of the 370 Chinese respondents expressed intentions to have children. Over 83 percent believed that marriage is necessary, with more female respondents considering marriage necessary (88 percent of females versus 78 percent of males). It appears that marriage and children remain normative among Chinese college students. If these attitudes are generalized to university graduates, it is clear that the observed lower marriage rate of university-educated women may not be entirely voluntary.

Among those who intended to have children, most preferred two children (56 percent) although 34 percent said they wanted three or more children. Only 22 students said they did not want any children, while just 12 preferred one child. Thus, nine out of 10 respondents intended to have at least two or more children. There were no differences by sex of respondent on number of intended children. Almost three out of four of the respondents said they would wait at least two years after marriage to have their first child.

Compared to females, males were more likely to want to start a family soon after marriage (31 percent versus 21 percent). On the whole, the sample's fertility intentions suggest little basis for further declines in fertility among highly educated Chinese.

The government often expresses concern over the large percentage of highly educated women who choose to remain single rather than marry "below themselves." Results from our survey suggest that this pattern is unlikely to change significantly: Most of the male respondents (47 percent) said they preferred a spouse with educational attainment similar to theirs; and almost equivalent percentages of the women expressed a preference for a partner with similar qualifications (40 percent) or more schooling (38 percent). In addition, almost 13 percent of the males preferred a partner with less schooling, while none of the women would consider marrying a man with less education.

In general, the sample expressed indifference to the SDU (54 percent), while about 20 percent said they were "agreeable" towards its activities and 18 percent said they were not. More males were receptive to the SDU's activities—26 percent compared to 17 percent of females. As expected, respondents who had no intentions of marrying or having children had the least positive attitudes toward the SDU.

More than one-half of all the respondents expressed a willingness to participate in various types of SDU activities, including lectures on courtship and marriage, and student socials and holiday cruises. There were no differences by sex on these items. The respondents balked, however, at participating in computer dating and matchmaking. Approximately 55 percent would not participate in computer dating, and females were clearly more negative about this than males: Males were split about evenly in their opinions, while 64 percent of women said they would not use this service. Opinions on marriages resulting from matchmaking were overwhelmingly negative, with about 85 percent of males and females saying they preferred to choose their spouse themselves.

Of course, these findings are based on limited data, but the overall picture shows that most highly educated Chinese Singaporeans intend to marry and have at least two children, and seem willing to participate in SDU activities that facilitate meeting potential spouses, but they are unwilling to yield to government control in actual dating and choice of spouse. Whether they can be motivated to have three or more children can only be determined by different data and with time.†

Discussion and Conclusion

The survey data indicate that the marriage and fertility intentions of Chinese Singaporean college students are at variance with the current practices of Singaporeans who are university graduates (most of whom are Chinese). They also provide evidence of widespread support for the norms of marrying and having two or more children. However, recent demographic trends in Singapore indicate delays in marriage, increased numbers of never-married Singaporeans and larger proportions of childless couples or couples with only one child—trends that are especially evident among university-educated persons younger than 40. It is possible that university students, when faced with the prospect of marriage and childbearing, may behave consistently with current practices, and therefore continue low fertility levels. This would not bode well for the future success of the pronatalist policy.

The Singapore case shows the various options countries can choose when faced with declining fertility. It is also significant because of the rapidity of the country's demographic transition from high to below-replacement fertility, and the dramatic reversal in its population policies. In spite of the limited success of the fertility incentive programs introduced since 1983, the government is convinced that it can persuade Singaporeans to reconsider their attitudes toward family size.‡ Because the population control policies in the 1960s and 1970s played a major role in decreasing fertility, the government is confident that it will be able to increase fertility.

The ultimate success or failure of current population policy and programs in Singapore cannot yet be determined, although we believe that these programs are unlikely to achieve the population objectives of the government. The very success of fertility limitation may well be a major obstacle to the new pronatalist policy. The two-child family is the norm for most Singaporeans, and current appeals for larger

(Continued on page 73)

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*The survey was funded in part by a grant to John Palen from the Population Council; the results are unpublished.

†Findings from a non-random sample survey of university graduates confirm the normative patterns on marriage and fertility observed in our data. The majority of the 398 respondents in that survey stated that the "ideal" number of children was three or more, and over 90 percent of those still unmarried would like to be married eventually. Again, these expressions of intended marital and fertility plans are not consistent with current patterns among highly educated Singaporeans. (See: "Grads' Ideals on Children Don't Match Reality: Survey," *The Straits Times*, Apr. 9, 1987.)

‡In 1989, the trend of a declining total fertility rate in Singapore was reversed: The TFR increased to 1.6 in 1989 and to 2.0 in 1990. It is unclear whether this signals a long-term change in fertility levels; it is also unclear which groups of women are contributing to the rise in the TFR. Therefore, the most recent TFR levels cannot be considered evidence of long-term changes in fertility or the success of pronatalist programs.

Books in Review

People vs. the Environment

The Population Explosion
by Paul R. Ehrilich and Anne H. Ehrlich, Simon & Schuster, New York, N.Y., 1990, $18.95, 320 pp.

Reviewed by Jodi L. Jacobson

The publication of *The Population Explosion*, by Paul and Anne Ehrlich, follows by two decades Paul Ehrlich's first major work on the subject, *The Population Bomb*. While the earlier book served to alert the general public to the likely social, economic and environmental consequences of rapid population growth, the new book tells us that, at 5.3 billion and rising, the human population bomb has now been "detonated," and that we must do whatever is within our means to clean up the resulting mess.

Most readers will find the Ehrlichs' fluid writing and well-researched presentation of issues compelling and persuasive. In its multiple roles as a chronicle of the decline in local and global environmental support systems, a useful reference on demographic concepts such as exponential growth and momentum, a treatise on the problems associated with rapid population growth and a guide to political action, *The Population Explosion* is highly readable and comprehensive.

The book arrives at a critical juncture in the evolution of public debate on the relationship of increasingly worrisome demographic and environmental trends. As we emerge from what is now commonly referred to as "the lost decade of the eighties," leaders in international development are seeking a renewed political and financial commitment to programs aimed at slowing population growth and coping with ecological degradation. Not surprisingly, those convinced of the need to accord these issues top priority on every nation's agenda view the next 10 years as a period that will "make or break" the fate of the planet.

This urgency is warranted. An additional one billion people will be added to the world's population by the turn of the century. Current estimates project a global population of over nine billion by 2030, a near doubling in less than 40 years. Given such a scenario, the prospects for restoring the ecosystems upon which human beings ultimately depend appear bleak indeed. But, as the Ehrlichs acknowledge early in the book, "the assault . . . upon the environment and resources of the planet is not just a matter of brute numbers of people. Rather it is what those people do; it is their impact on the things we care about—on each other, on nonrenewable resources, and above all on the environmental systems that sustain us" [p. 58].

It has long been recognized that people are the root cause of the deterioration of air, soils and water, whether through pollution or overuse. Human beings are rapidly consuming finite resources such as oil and destroying renewable ones such as forests. More recent additions to this list of ills are vast global changes such as the expected warming of the earth's atmosphere caused by [illegible] buildup of "greenhouse gases" like [illegible]n dioxide, and the depletion of the ozone layer resulting from the use of chlorofluorocarbons. These problems are complicated by their interconnections: Net losses of forest cover worldwide, for example, increase atmospheric carbon dioxide. If we act now, we can hope to reverse the decline in renewable resources locally within a matter of years or decades; if we do not, we risk irreversible global changes.

Meanwhile, we find ourselves backsliding in the struggle to meet basic human needs. Despite decades of economic growth, the number of people who lack access to adequate food and health care, clean water, good housing and education is greater than ever before. That a growing world population will exacerbate these problems, as the Ehrlichs' book points out, is not in dispute. But the book is flawed by the Ehrlichs' eagerness to attribute virtually all of the world's social and environmental ills to overpopulation, giving short shrift to the roles that poverty, inequality and consumption play in current demographic and environmental trends. As many studies show, high fertility rates in developing countries reflect persistent poverty and political powerlessness, particularly among women; nevertheless, the Ehrlichs' strident calls for demographic targets, immigration quotas and absolute reductions in the size of the global population are barely tempered by scattered references to the need to encourage better use of resources or to address the problem of poverty, clearly the most effective steps in solving environmental problems in the short run.

One of the major weaknesses in the Ehrlichs' argument stems from their biased application of "carrying capacity" to the problems of environmental degradation. Carrying capacity is a concept used by biologists to describe the relationship between the size of an animal population and the capacity of the surrounding environment to support it. Applying this concept to human populations is inherently difficult because, unlike other species, humans can manipulate natural resources through technology.

They also fail to acknowledge the extent to which the consumption patterns of a small but privileged share of the earth's population contribute to environmental problems. For instance, there is the issue of climate change. The burning of fossil fuels was the source of 21 billion of the total 24 billion tons of carbon dioxide released into the atmosphere in 1988. (Deforestation and other factors make up the rest.) Seventy percent of fossil fuel emissions derived from activity in developed countries, which together make up only 25 percent of the world's population. The average American, for example, consumes 26 times as much fossil fuel as does the average South Asian. Yet the Ehrlichs claim that because the "atmospheric concentrations of greenhouse gases are tightly tied to population size. . . . there is no practical way to achieve the necessary reduction in greenhouse emissions without population control" [p. 59].

By changing their habits, U.S. consumers alone could make a tremendous contribution to reducing carbon emissions long before any changes in demographic trends could have a notable impact. Clearly, the earth could not support 10 billion people living at the U.S. level of consumption. But given that we are unlikely, barring draconian measures, to end up with less than eight billion people by the middle of the next century, we must make changing consumption patterns a major focus of policymaking today. Most current models suggest that to slow or prevent human-induced climate change, the world community will have to reduce total emissions of carbon dioxide by some 50–70 percent by the middle of the next century. In fact, more efficient use of energy and the development and popularization of renewable

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energy technologies could keep total emissions to six billion tons in 2010 instead of the nine billion tons suggested by current trends, even taking into account increases in the world's population.

Over the long term, of course, the rate of change in global carbon emissions will depend on the size of the world's population. But, even in the most populous countries, the choices made today about energy use are as important as future population size. Although per capita emissions of carbon in most developing countries are far lower than in industrial countries, many make up for this by the sheer size of their populations. The 1.3 billion Chinese emit only 0.6 tons per person annually, but together account for 11 percent of annual global emissions. Even if the Chinese were the only people on earth, but lived as the 250 million in the United States do, the world would still face the threat of climate change. Unfortunately, China is now mining its extensive coal reserves and imitating the West in energy-intensive patterns of industrialization and transport.

The Ehrlichs are most persuasive in their comprehensive discussion of the importance of population in relation to food supply, to which they devote two chapters. As the book points out, the chronic hunger and malnutrition evident throughout the world are in part related to purchasing power, consumption patterns and the economics of food distribution. The Ehrlichs estimate that about a billion or so people in the world, mostly in wealthy countries, are "too well-fed"; this group uses about one-third of the world's grain for livestock feed to provide themselves with meat, eggs and dairy products. An additional three billion people, many of them on a meatless diet, are adequately nourished. Another billion are chronically malnourished, half of them to such an extent that their health is threatened or their growth stunted. The Ehrlichs note that if food were better distributed, the poor would be better fed, but not much would be left over to accommodate an increase in population. Worldwide, food production has increased somewhat faster than population growth, but only through the use of resource-intensive farming practices that are themselves the culprit in much environmental damage. Moreover, food production has fallen behind population growth in two regions, Africa and Latin America. And the Ehrlichs are rightfully troubled by food production trends in the two most populous countries, China and India.

The Ehrlichs point out that population growth compromises food production and improved nutrition in much of the world. But putting all or most of the blame on population growth would be like constructing only half the puzzle. In these chapters, by discussing skewed patterns of land distribution and agricultural policies that ignore the needs of the poor as well as population growth, the authors provide the missing pieces. In Brazil, for example, one percent of landowners own 45 percent of the available arable land. Much of the deforestation in the Amazon basin, often blamed solely on population growth, can be traced back to the land tenure situation, which forces poor farmers to clear virgin forest. Throughout the rest of Latin America, as in India and much of Africa, land tenure patterns, the mechanization of farming and the subsidization of export crops to earn foreign exchange have compromised the ability of small farmers to produce food and have increased the numbers of landless people.

Unfortunately, *The Population Explosion* virtually ignores the powerful and all pervasive politics of reproduction. The discussion of abortion and contraception is facile, refers only to the United States and is sometimes ill-informed. The authors state, for example, that "abortion is a crude and relatively dangerous method of birth control even when legal and conducted under medical auspices" [p. 196]. Women's health issues are also absent: A chapter on population and public health fails to mention the enormous toll taken by maternal mortality and morbidity.

The Ehrlichs strongly advocate "population control" rather than, as they put it, "the more euphemistic 'family planning' [which] all too often means planning to have too many children but spacing them more evenly" [p. 190]. (So much for voluntary family planning.) In supporting their call for population control, the Ehrlichs point out that 97 percent of women in Rajasthan, India, who refuse birth control are "well-informed on family planning programs." The problem, they declare, "is that family planning focuses on the needs and desires of individuals and couples; population control focuses on the needs of societies as well." They then add, in a somewhat confused reflection on these statements, that "of course, population control need not be coercive" [p. 190].

These statements are troubling for several reasons. First, there is no discussion whatsoever of the cultural and economic obstacles to closing the gap between knowledge and practice in contraceptive use. In societies where cultural constraints on women are strong and where women remain economically and politically subservient to men, an individual woman has little, if any, power to determine at what stage she becomes sexually active, to whom she is bonded, when sex will take place, or when and how to bear children. Once a woman marries, decisions about the timing and number of births are more often the prerogative of her husband and in-laws than of the woman herself. Without considering these issues, the Ehrlichs cannot hope to "end the population explosion humanely."

Furthermore, use is often limited by cost, availability or the fact that contraceptives on the market don't suit women's needs. Even when the means to prevent pregnancy are available to women in the Third World (and this is relatively rare), lack of spousal support often leads to high rates of contraceptive failure.

Last, the documented increase in unmet need for family planning worldwide suggests that governments and policymakers have not gone far enough in making family planning or primary health care a priority, or in finding out what women perceive their needs to be and how these needs might best be met.

The Ehrlichs argue that "limiting human numbers will not alone end warfare, environmental deterioration, poverty, racism, religious prejudice, or sexism; it will just buy us the opportunity to do so" [p. 23]. A different analysis leads to the conclusion that many of these social ills are part and parcel of global population trends and must be addressed from the very start.

An Updated Text

The FIGO Manual of Human Reproduction

series editors Allan Rosenfield and Mahmoud F. Fathalla, The Parthenon Publishing Group, Carnforth, England, 1990, $90 for 3 volumes; $475 for complete set of slides and books.

Reviewed by Ramiro Molina Cartes

Those of us who have long been teaching with the *Manual of Human Reproduction*, published originally by the International

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Federation of Obstetrics and Gynecology (FIGO) and the Population Council in 1975, cannot help but be delighted with the 1990 revision, edited by Allan Rosenfield and Mahmoud F. Fathalla. The new, three-volume manual on the science of human reproduction, which incorporates feedback from the first edition, forms a complete lecture course when used with the accompanying full-color slides.

The first volume of the set covers the physiology of reproduction, the second, family planning and the third, global aspects of reproductive health. The new manual, oriented to the needs and realities of the developing world, has been updated and restructured to reflect recent improvements and advances in the field. The individual volumes and the chapters in each volume can be used independently, since they each offer a comprehensive treatment of their topic and contain a separate table of contents, references and illustration credits.

Volume 1, *Reproductive Physiology*, edited by Luigi Mastroianni, Jr., and Christos Coutifaris, consists of six chapters. It has been updated with new information on hypothalamic releasing factors and their cycles, the biosynthesis of sex steroids and the characteristics of the ovum's transport system. Aspects of the embryo's development have also been added to the description of reproductive anatomy. The volume concludes with a summary of the normal human sexual response.

The major change since the first edition is the chapter "Genetics and Reproduction," a tight, well-executed synthesis that covers basic terminology and elements of genetics; genetic diseases affecting pregnancy, reproduction and the family; and the indications and problems associated with fetal diagnosis and its effects on reproductive behavior. The chapter's illustrations are excellent and abundant, making the complex material accessible to the nonspecialist.

The second volume, *Family Planning*, edited by Mahmoud F. Fathalla, Allan Rosenfield and Cynthia Indriso, consists of nine chapters and has been almost completely restructured. The first offers a description of the basic principles of contraception. Beginning with the modern methods, the individual methods are developed in the eight subsequent chapters, reviewing the acceptability, continuation rates, effectiveness and safety of each.

The material on oral contraceptives has been restructured and given a more clinical emphasis in the new edition. The editors have added new paragraphs on postcoital contraception, the use of the pill among special groups such as nursing mothers and adolescents, and the pill's interaction with other drugs and with tropical diseases. However, it would have been useful to have information on pill use among disabled women who, thanks to medical advances, are now reaching reproductive age and have additional risks of cardiovascular and neurological complications. Also, there is barely any mention of older women's use of the pill: Since many 35–40-year-olds rely on oral contraception, material on the relative and absolute contraindications to use among this age-group would be welcome. The editors have also introduced a discussion of the risks and benefits of oral contraceptives into this edition. Safety issues are discussed separately, however, in an updated review of the relationship between gynecologic cancers (particularly breast and cervical cancer) and contraceptive steroids.

A separate chapter covers long-acting hormonal contraception, updating information on implants and steroid-releasing vaginal rings. The chapter on intrauterine devices has been restructured in a more didactic format, expanding on the clinical aspects of IUDs. However, important aspects, such as diagnostic and therapeutic techniques and the detection of side effects, have yet to be included. The chapter on barrier methods now includes more information on the use of the condom and the cervical cap.

The sixth chapter discusses "periodic abstinence," a more appropriate term than the commonly used "natural methods." An analysis of the cervical mucus, or Billings, method has been added in this edition and the chapter concludes with an excellent table comparing the advantages and disadvantages of the ways in which periodic abstinence can be practiced.

The chapter on surgical contraception contains new visual material on laparoscopy. The penultimate chapter in the volume covers pregnancy termination and has been updated with information on RU 486 and on techniques for using prostaglandins. It also describes the health and demographic impact of abortion legislation more effectively than did the earlier edition. The final chapter, on family planning programs and services, has been rewritten and updated to reflect the results of the World Fertility Surveys and now stresses the importance of primary health care, especially in Africa and in the densely populated countries of the developing world.

The third volume, *Reproductive Health: Global Issues*, differs from the first edition in both focus and content. Edited by the same team as the second volume, with the addition of Dilup K. Sen and Shan S. Ratnam, its 10 chapters cover the most important topics in reproductive health today and successfully incorporate both clinical and service aspects, with an emphasis on public health. Each subject area is expanded on, from its basic principles to its more complex aspects, including future possibilities. Whereas the entire volume in the first edition had a demographic focus, the revised edition devotes only the first two chapters to demography, chiefly its impact on development and health.

Unlike the original manual, this edition covers infertility, using mostly research material from the countless multicenter projects supported by the World Health Organization's Special Programme of Research, Development and Research Training in Human Reproduction. This is an excellent chapter, from which the nonspecialist can rapidly learn the most important points about infertility and understand its priority within the context of major reproductive health problems. In a chapter on maternal mortality the editors discuss the importance of illegal septic abortion as a major cause of maternal deaths. The material does not include much detail—probably because of the lack of reliable data—but given the controversial nature of abortion and its broad impact throughout much of the developing world, the subject could merit its own chapter in future editions.

The chapter devoted to adolescent sexuality and pregnancy describes the principal characteristics of adolescent physical development and related problems of mental and social health. It begins with an excellent introduction to counselling both adolescents who are sexually active and those who are not and discusses the sensitive problems of method provision; however, the legal problems, in both the developed and developing world, of providing services to minors are left out. Just under half the chapter reviews contraceptive use among adolescents, focussing on the suitability of specific methods to this population. It would be useful if future editions were to include a comparison of contraceptive failure rates between adolescents and adults, along with some suggestions or comments on how best to reach adolescents at risk of pregnancy.

Two chapters cover sexually transmitted diseases (STDs). One is reserved for the most common STDs—including chlamydia and the herpes virus—and their pathologies, prevention and treatment.

The editors also discuss the relationship between contraceptive use and the impact of STDs on maternal and child health.

The other chapter on STDs is devoted to AIDS and its implications for women and children. This long and well-documented discussion treats the basics of immunology, the epidemiology of the disease, the links with contraceptive use and breastfeeding, and the prospects for a vaccine in the future. The chapter concludes with a discussion of the epidemic's impact on maternal and child health and on the delivery of health services. This is invaluable teaching material, with an abundance of well-designed graphs and charts.

The ninth chapter in the volume offers a comprehensive review of gynecologic cancers, including breast cancer. The analysis is epidemiologic and concentrates on prevention within primary health care. The tenth and final chapter is devoted to breastfeeding, describing its importance to infant development and the need to promote breastfeeding for child health. In addition, the editors review contraceptive options for breastfeeding mothers and the interrelationships between AIDS and breastfeeding.

In summary, the revised FIGO manual is an excellent text in reproductive health. The visual representation of the material, and its educational format, facilitate comprehension among readers with a basic background in human reproduction, and educators may therefore find it useful for diverse purposes. Although written with the medical student of obstetrics and gynecology in mind, it could easily prove accessible to undergraduates and even preuniversity students in many divisions of the health and social sciences. The manual provides high-quality material for specialists as well, since it incorporates the latest information. The teaching material is universal and can be modified to fit most any educational setting or objective. Moreover, translations of the manual into Spanish and French will be available in 1992, extending its usefulness throughout the developing world.

Fertility Decline and Pronatalist Policy . . .

(Continued from page 69)

families are directed at an increasingly affluent and consumption-oriented society. Singaporeans may not be willing to risk their higher standard of living by having large families, and economic incentives may not mean as much to couples who are already relatively well-off.

In addition, women have become an essential part of the labor force, and higher rates of female work force participation are often accompanied by low fertility. Unless female labor force participation changes dramatically—and there is no indication that it will—it is unlikely that fertility, particularly of the well-educated and affluent, will increase. The Western industrialized nations' experiences are informative; those nations with low fertility show no signs of the social changes that would reverse their situations.[34]

Low period fertility rates do not automatically lead to low cohort fertility, however. Women may be deferring childbearing temporarily by delayed marriage and use of effective contraceptives. It therefore remains to be seen if current and future cohorts of Singaporean women in their reproductive years will sustain below-replacement fertility. The population dilemma for Singapore's political leaders is finding an effective means to convince Singaporeans of the personal rather than the public benefits of having more children. Since the government does not, at this point, consider immigration a viable option for maintaining population size, the effort to promote higher fertility through incentives may continue for many years. However, history suggests both caution and patience in responding to fertility changes.

References

1. M. S. Teitelbaum and J. M. Winter, *The Fear of Population Decline*, Academic Press, Orlando, Fla., 1985.

2. "On Pronatalist Policies in the Soviet Union," *Population and Development Review*, **7**:372, 1981; J. L. Simon, *The Ultimate Resource*, Princeton University Press, Princeton, 1981; and B. Wattenberg and K. Zinsmeister, "The Birth Dearth: The Geopolitical Consequences," *Public Opinion*, **8**:13, 1986.

3. *World Population Data Sheet*, Population Reference Bureau, Washington, D.C., 1989.

4. S. M. Lee, "Female Immigrants and Labor in Colonial Malaya: 1860–1947," *International Migration Review*, **23**:309, 1989; K. S. Sandhu, *Indians in Malaya: Some Aspects of their Immigration and Settlement, 1786–1957*, Cambridge University Press, Cambridge, 1969.

5. J. T. Fawcett and S. E. Khoo, "Singapore: Rapid Fertility Transition in a Compact Society," *Population and Development Review*, **6**:549, 1980; S. H. Saw, *Singapore Population in Transition*, University of Pennsylvannia Press, Philadelphia, 1970; A. K. Wong and J. Salaff, "Planning Births for a Better Life: Working Class Response to Population Disincentive," in P. Chen and J. Fawcett, eds., *Public Policy and Population Change*, The Population Council, New York, 1979.

6. R. Leete, "The Post-Demographic Transition in East and South East Asia: Similarities and Contrasts with Europe," *Population Studies*, **41**:187, 1987.

7. "Lop-Sided Birth Rate Drop," "80 Percent Nature and 20 Percent Nurture," and "Talent for the Future," *The Straits Times*, Aug. 15, 1983.

8. C. K Khoo, *Census of Population 1980, Singapore*, Release No. 1, Department of Statistics, Singapore, 1980.

9. "Singapore's Ethnic Balance Shifting," *International Demographics*, **6**:11, 1987.

10. "When Graduate Doesn't Marry Graduate," *The Straits Times*, Sep. 5, 1983.

11. *Statistics on Marriages and Divorces, 1985*, Department of Statistics, Singapore, 1986.

12. C. K. Khoo, *Census of Population 1980, Singapore*, Release No. 9, Department of Statistics, Singapore, 1981.

13. *World Population Data Sheet*, 1988, op. cit. (see reference 3).

14. M. S. Teitelbaum and J. M. Winter, 1985 , op. cit. (see reference 1).

15. "Lop-Sided Birth Rate Drop," "80 Percent Nature and 20 Percent Nurture," "Talent for the Future," 1983, op. cit. (see reference 7).

16. "When Graduate Doesn't Marry Graduate," 1983, op. cit (see reference 10).

17. S. H. Saw, "New Population Policies for More Balanced Procreation," *Contemporary Southeast Asia*, **17**:2, 1985.

18. "You Can't Succeed in Both Career and Marriage," *The Straits Times*, Aug. 16, 1983.

19. J. J. Palen, "Fertility and Eugenics: Singapore's Population Policies," *Population Research and Policy Review*, **5**:3, 1986.

20. "Graduate Mum Scheme to Go," *The Straits Times*, Mar. 26, 1985.

21. S. H. Saw, 1985, op. cit. (see reference 17).

22. S. Mydans "How to Marry Up, and Avoid the Frogs and Nerds," *New York Times*, July 11, 1988.

23. "Affordability Level Counts, not the Education Level," *The Straits Times*, Mar. 2, 1987.

24. Ibid; "Dr. Hu's Third Child Carrot," *The Straits Times*, Mar. 5, 1987; "Third Child HDB Priority," *The Straits Times*, Apr. 4, 1987.

25. "Birth of Another Nation," *The Economist*, Mar. 10, 1990, p. 37; D. E. Sanger, "An Incentive For Bigger Families," *The New York Times*, May 15, 1990, p. D5.

26. "Time to Educate a New Generation," *The Straits Times*, Mar. 2, 1985.

27. "One Woman in Three Seeks an Abortion," *The Straits Times*, Aug. 6, 1986.

28. "Government Hopes to Restrain and Later Reduce Number of Abortions," *The Straits Times*, Mar. 26, 1986.

29. S. H. Saw, "Indian Immigration in Malaya Before the Second World War," *Malaysia in History*, **23**:47, 1980.

30. S. H. Saw, 1985, op. cit. (see reference 17); "When Couples Have Fewer Than Two," *The Straits Times*, June 15, 1986.

31. "Disaster if Sparse Birth Patterns Remain Unchanged," *The Straits Times*, Dec. 15, 1986.

32. "Affordability Level Counts, not the Education Level," 1987, op. cit. (see reference 23).

33. "Birth of Another Nation," 1990, op. cit. (see reference 25).

34. C. F. Westoff, "Fertility Decline in the West: Causes and Prospects," *Population and Development Review*, **9**:1983.

DIGEST

Family Planning Programs Will Lead to One-Third Reduction in Developing-World Population by 2100

The population of the developing world is 412 million people smaller than it would have been if there had been no family planning programs; by the year 2100, the developing-world population is expected to be 10 billion, one-third lower than it would have been if there were no family planning programs.[1] According to a recent analysis of the impact of family planning programs, the eventual size of the world's population could vary widely, depending on the use of family planning services.

According to United Nations estimates, the total fertility rate (TFR) in the developing world declined from 6.1 lifetime births per woman in 1960–1965 to 4.2 per woman in 1980–1985. However, certain regions attained far lower fertility rates than others. In East Asia, for example, the TFR for 1980–1985 was 2.4 births per woman, down from 6.1 in 1960–1965. In contrast, the African TFR fell by just 0.3 births per woman, from 6.6 in 1960–1965 to 6.3 in 1980–1985.

Contraceptive use in the developing world grew in a pattern similar to TFR declines. Although overall contraceptive prevalence among developing nations rose from nine percent to 45 percent between 1960–1965 and 1983, prevalence in East Asia rose from 13 percent to 74 percent between those two periods. Contraceptive use nearly tripled in Africa during that period (from five percent to 14 percent), but as of 1983 the vast majority of Africans were not using contraceptives.

Because of these disparities, three Population Council researchers sought to determine the effects of family planning programs on fertility decline and population growth in developing countries. Using indices of economic development and family planning program effort, they first categorized the developing countries according to four levels of development (ranging from high to low) and four levels of program effort (ranging from strong to very weak or none). A multiple regression analysis indicated that development and program effort mutually reinforce each other, so that the effect of strong program effort is not nearly as great for countries with a low development index as for those with a high development index. The analysis showed that in the absence of family planning programs, the TFR in the developing world during 1980–1985 would have been 5.4 births per woman, 1.2 births more than the estimated TFR for that period.

The investigators then projected the effects of such programs on future fertility. They began with the assumption that in the absence of family planning programs, fertility decline in the developing world would have occurred at the same rate as it has, but would have begun later. They determined that for the 1980–1985 TFR to have been 5.4 births per woman, the fertility decline would have had to have begun about 9.8 years after it did. An adjustment of the standard World Bank population projection that takes this delayed beginning into account shows that as of 1990, the population in the developing world was 412 million lower than it would have been if there had been no family planning programs up to that point. As shown in Table 1, the standard World Bank population projection for the year 2050 is 8.8 billion, but if worldwide fertility decline had started 9.8 years later in the absence of family planning programs, the total in 2050 might have been as much as 11.9 billion. Similarly, the standard World Bank projection for 2100 is 10.0 billion; the projected population in the absence of family planning programs is 14.6 billion.

Table 1. Standard population projections for the developing world for the years 2050 and 2100, and projections without family planning programs and without unwanted births (in billions)

Model	2050	2100
Standard projection	8.8	10.0
Without programs	11.9	14.6
Difference	3.1	4.6
Standard projection	8.8	10.0
Without unwanted births	7.3	7.8
Difference	1.5	2.2

Research has shown that a substantial number of women in developing countries who do not want any more children or who want to space their births do not use contraceptives. As births resulting from such nonuse would be classified as unwanted or unplanned, the impact of unwanted fertility on population size is likely to be significant. The researchers estimate that 21 percent of current childbearing in the developing world is unwanted. They plotted the population growth in the absence of unwanted births, again using World Bank projections (see Table 1). The difference between the World Bank standard population projections and population projections in the absence of unwanted births indicates that without unwanted births, the developing-world population in 2050 would be 1.5 billion lower than is projected, and in 2100 would be 2.2 billion lower.

The researchers conclude that family planning programs have had a significant effect on population growth in developing countries, particularly those of Latin America and Asia, and can continue to do so in the future. Although they acknowledge that the elimination of all unwanted childbearing would be impossible, they believe that "improved programs and contraceptive technology can produce significant further declines in fertility, and this in turn can have potentially very substantial effects on the population sizes of developing countries in the long run."—*P. Rind*

Reference

1. J. Bongaarts, W. P. Mauldin and J. F. Phillips, "The Demographic Impact of Family Planning Programs," *Studies in Family Planning*, 21:299, 1990.

China's Fertility Patterns Closely Parallel Recent National Policy Changes

Fluctuations in birthrates in China closely reflect changes in national marriage and family policies, according to the results of three recent studies. An analysis of data from the 1987 national population survey finds that the proportion of Chinese mothers with one child who go on to have a second child dropped to just 63 percent in 1984. A subsequent relaxation in enforcement of China's one-child policy appears to have caused a temporary increase in second births in China in 1986–1987, which accounted for most of that period's overall fertility increase.[1] Findings from smaller surveys in the provinces of Hebei and Shaanxi show that the one-child policy has had varying impacts in urban and rural areas, and higher socioeconomic development is associated with lower rates of second births.[2] On the other hand, an analysis of a large 1988 national survey indicates that the marriage "boom" resulting from a relaxation of marriage restrictions in 1980 exercised a greater influence on rates of second births throughout the period 1980–1986 than did the vigor with which the one-child policy was enforced.[3]

National Analysis, 1987

In a study based on data from the 1987 One-per-Hundred Survey, investigators analyzed fertility data for 172,446 women aged 15–64. Because the survey, which was similar to a census, did not take detailed birth histories, the investigators reconstructed the women's birth histories using an extension of the "own children" technique, and then calculated transition rates from first births to higher order births and derived annual total fertility rates (TFRs) from these data. Since the 1987 survey was conducted in mid-year, the data were organized not by calendar years but by years ending in June (i.e., the data for 1987 refer to the period from July 1986 through June 1987).

The one-child policy—"one is best, at most two, never a third"—was enacted in 1979 and resulted in sharp declines in the rate of progression to second births in 1981 and 1982. For example, in 1979, fully 95 percent of Chinese mothers who had had one child would have been expected to go on to have a second child, but this proportion declined to 87 percent in 1981 and to 83 percent in 1982. This trend continued at an even faster pace in the following two years, with the parity progression ratio reaching a low of 63 percent in 1984. However, in the following three years, the trend was reversed, and there was a steady increase in the rate of second births; the proportion of women who went on to have a second child rose from 65 percent in 1985 to 77 percent in 1987.

Transition rates to higher order births followed a different pattern. The proportion of Chinese women with two children who went on to have a third began to decline in the early 1970s and experienced a pronounced drop between 1980 and 1981, from 64 percent to 54 percent; after a slight increase to 58 percent in 1982, this decline continued unabated through 1986, when the proportion reached 43 percent. In 1987, however, it rose slightly, to 48 percent. Similarly, the rate of progression from third births to fourth births and from fourth births to fifth births increased in that year, from 36 percent to 39 percent and from 31 percent to 35 percent, respectively.

The researchers calculate that the increase between 1986 and 1987 in the progression to second births explained 89 percent of the overall increase in the TFR (as calculated from the parity progression ratios) over that period. An additional nine percent of the increase was accounted for by the rise in progression to third and fourth births. The researchers speculate that fluctuations in the proportion of women who had second-order and higher order births followed changes in the implementation of the one-child policy: The initial slow decline corresponded to the relatively lenient start-up period of 1980–1981, the quickened pace of the 1982–1984 decline followed stricter enforcement, and the subsequent increase in 1984–1987 corresponded to a relaxation of the policy in 1984–1986.

According to the researchers, the proportions of women having a second birth in China are extremely low by any standard; this affirms that the impact of the one-child program has "taken China far outside the bounds of usual human experience." The relaxation of the one-child policy in 1984–1986 may have been a premature response to its earlier success. The researchers predict that future efforts may bring the rates of progression to higher parities down again, but "resurgences are likely after the campaigns have run their course."

Hebei and Shaanxi, 1980–1984

Another analysis used data from two small-scale surveys in the provinces of Hebei and Shaanxi to determine the rates of second-order and third-order births and the characteristics of couples who have them. The In-Depth Fertility Survey, conducted in April 1985, employed a stratified multistage sample and gathered data on conceptions occurring between January 1980 and July 1984 that ended in live births. (Conceptions occurring in the nine months before the survey date were omitted, since their outcomes would be unknown.)

The analysis of the transition to a second birth included 2,599 women who had had their first child by January 1980—1,566 from Hebei province (1,263 from rural areas and 303 from urban areas) and 1,033 from Shaanxi (781 from rural areas and 252 from urban areas). Since minorities have always been exempt from the one-child policy, the analysis included only Han Chinese. The researcher constructed a proportional hazards model to examine the simultaneous effects of socioeconomic and demographic variables on the likelihood of having a second child.

Rates of second births differed widely according to area of residence and to household income. For example, the percentage of women who had one child and went on to have a second birth was nearly twice as high in rural areas as in urban areas (49 percent vs. 26 percent in Hebei, and 55 percent vs. 30 percent in Shaanxi). The multivariate analysis of the relative probability of having a second birth revealed that in rural areas of both provinces, the sex of the first child significantly influenced that probability ($p<.05$). Moreover, in urban areas of Hebei and in both urban and rural areas of Shaanxi, couples in households with the highest annual income (more than 400 yuan per person) were significantly less likely to have a second birth than were couples in the lowest income group (200 yuan or less per person). In rural Hebei and urban Shaanxi, women living with their parents or in-laws were also significantly more likely than women who did not to have a second birth, confirming the researcher's hypothesis that the presence in the household of parents (who are likely to be more traditional) would positively influence the probability of a second birth.

In 1984, the Chinese government relaxed the one-child policy somewhat, allowing some couples whose first child was a girl and couples who were living in disadvantaged areas to have a second child. To determine how fertility was affected, the periods directly before and after the enactment of this change were entered into the multivariate models. The results indicate that in rural Hebei, the influence of the sex of the first child on the probability of having another child closely followed the change in policy: In 1984, women whose first child was a girl were 1.9 times as likely to have a second birth as were women whose first child was a boy, compared with risks of 1.5 in 1982–1983 and 1.2 in 1980–1981. This pattern was not observed in rural Shaanxi, reaffirming the researcher's premise that the one-child policy was more strictly enforced in that area.

An analysis of urban and rural residents that controlled for a number of demographic and socioeconomic variables* revealed that the probability of a second birth did not vary significantly by urban or rural residence in Shaanxi. This suggests that the sex of the first child, the yearly household income and the possession of a television all contributed significantly ($p<.05$) to the probability of a second birth in Shaanxi, independently of area of residence. On the other hand, urban or rural residence remained a significant indicator of a second birth in Hebei.

Overall, yearly household income emerged as the strongest determinant of differentials in second births. According to the researcher, further reductions in urban fertility can be expected if China's economy remains stable, since higher income was associated with lower probabilities of second births in urban areas. Furthermore, the results fail to support the notion that "more affluent peasants can better afford to violate the one-child policy, and, therefore, are more likely to have more than one child." Finally, since second-order and higher order births are still common in rural areas and since neither son preference nor rural economic conditions are likely to change in the next few years, the researcher concludes that a strong government policy is needed to maintain current fertility levels—or to lower them further—in rural areas of Hebei and Shaanxi.

National Analysis, 1988

In 1980, a new marriage law lifted bureaucratic restraints on marriage before age 23 for rural women and before age 25 for urban women. Researchers used data from a 10 percent sample of the 1988 Two-per-Thousand Survey (which collected detailed birth history data from women aged 15–57) to examine the effects of changing nuptiality patterns since 1980 on trends in fertility.

The researchers calculated the total first marriage rate (TMR)† for the years immediately before and after the change in the marriage law. Once the restrictions on age at marriage were lifted, the TMR increased by 41 percent (from 0.9 in 1979 to 1.3 in 1981). It remained above 1.0 through 1987, and the mean age at first marriage fell by 1.4 years in the period 1979–1985. Thus, the change in enforcement of marriage regulations was followed by a substantial increase in marriages among Chinese women in their early 20s.

Since marriage is universal in China and nearly all childbearing is marital, calculating the total fertility rate by duration of marriage (the total duration-specific fertility rate, TDFR) rather than by age results in a synthetic measure of fertility that is free from the effects of changing age at marriage. Throughout the period 1950–1981, rising age at marriage kept the TDFR above the total age-specific marital fertility rate (TAFR); increasing age at marriage decreased the number of young women who were married, and childbearing among the lower age-groups was strongly reduced as a result. However, when age at marriage declined in the early 1980s, the two rates converged: As a result of having several "marriage crops" in the same year (since [illegible] women married instead of waiting [illegible] previously recommended age), the TAFR for first marital births in 1978–1987 was 36 percent higher than the rate for 1970–1978 (1.04 vs. 0.76), while the TDFR changed very little. Likewise, the TAFR for second marital births also rose sharply in the 1980s—the 1987 rate was 43 percent higher than the 1980 rate—but the TDFR for second births actually declined over the period.

The investigators comment that the number of women having their second child at that time was "greatly inflated by the [marriage] boom that began in 1980," and that the "effect of the one-child policy was not in fact greatly weakened." They conclude that the marriage boom sparked by the 1980 relaxation of the marriage laws was a "major element in the [seemingly] undiminished or rising fertility" of the Chinese population in that period.—*L. Remez*

References

1. N. Y. Luther, G. Feeney and W. Zhang, "One-Child Families or a Baby Boom? Evidence from China's 1987 One-per-Hundred Survey," *Population Studies*, **44**:341, 1990.

2. U. Larsen, "An Assessment of the One-Child Policy in China from 1980 to 1985," *European Journal of Population*, **6**:257, 1990.

3. A. J. Coale et al., "Recent Trends in Fertility and Nuptiality in China," *Science*, **251**:389, 1991.

Burmese Total Fertility Rate Remained Stable Between 1973 and 1983

There is little evidence of fertility decline in Burma between 1973 and 1983, according to a recent analysis of census data.[1] The total fertility rate did not change over the period, but the crude birthrate apparently decreased, especially in urban areas. Age at marriage rose and the proportion of women entering the reproductive years decreased during the decade between the censuses, leading the investigator to suggest that fertility may have declined in urban areas.

Burma (now known as Myanmar) is geographically a large country in Southeast Asia. The 1983 census revealed a population of 35.3 million, more than two-thirds of whom are ethnic Burmese. Buddhism is practiced by 89 percent of the population. Burma is primarily a rural society, and has been isolated from most of the outside world for some time.

The author of the report derived estimates of fertility rates primarily from Burma's 1973 and 1983 censuses. In the 1983 census, 20 percent of households received a long form that included questions about the number of children ever born and the number of children surviving. The 1983 fertility estimates rely heavily on those data.

For the period 1973–1983, the average intercensal crude birthrate (CBR) was 34 births per 1,000 population. Using the reverse-survival technique and the age distribution from the 1983 census, the investigator derived independent estimates of the CBR for two and one-half years before and seven and one-half years before the 1983 census, and found overall CBRs of 34 per 1,000 population for 1975 and 31 per 1,000 population for 1980. A straightforward CBR calculation of the 1982 CBR from the 1983 census data on number of children born last year yielded an estimate of 35 per 1,000. The author suggests that the apparent decline may be due both to a low proportion of women entering the reproductive years and to an increase in female age at marriage. In contrast to the trends in overall CBR and in rural CBR, the CBR for urban areas appears to have declined between 1975 and 1982 (from 30 per 1,000 to 27 per 1,000). The author cautions, however, that this 10 percent drop is not large enough to support the assumption that fertility declined in urban areas; the drop may again be related to a decrease in the proportion of women of reproductive age and an increase in women's age at marriage.

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*These variables were: urban or rural residence, sex of first child, living arrangements (lived with parents for less than two years or two years or more, still living with parents, or never lived with parents), wife's literacy, husband's literacy, yearly household income (less than 201 yuan, 201–400 yuan or more than 400 yuan), possession of a radio, possession of a television, availability of water, and reason given for the government's one-child policy (for population control, for economic development or health, other, and don't know).

†The TMR is the sum of all marriage rates in a given period, from the youngest age at first marriage to the oldest age at first marriage. It equals 1.0 when marriage is universal (as it is in China) and when the mean age at marriage is holding relatively steady. The TMR will exceed 1.0 when an unusually large number of women of different ages marry in the same year.

Based on the 1983 data, the total fertility rate (TFR) for 1982–1983 is estimated to be 4.7 lifetime births per woman. In urban areas, the TFR is 3.4 births per woman, while in rural areas it is 5.2 births per woman. A comparison of these estimates with TFRs for 1973–1978 derived from the 1975 CBRs shows possible competing trends of decreasing fertility in urban areas and increasing fertility in rural areas, which result in little to no change in overall TFR between 1973–1978 and 1982–1983 (4.6 and 4.7 births per woman, respectively).

There is almost no out-of-wedlock childbearing in Burma. Therefore, trends in age at marriage should affect trends in fertility. In 1983, both in urban and rural areas, a greater proportion of women were single in each five-year age-group from 15–19 to 35–39 than was the case in 1973. In addition, the singulate mean age at marriage was higher in 1983 (22.4) than in 1973 (21.3). In urban areas, the singulate mean age at marriage rose by 1.5 years (from 21.9 to 23.4), while in rural areas it rose by one year (from 21.1 to 22.1). The investigator concludes that "the decline in CBRs . . . is due in part to the increase in female age at marriage [and] the large proportion of females remaining single at the key reproductive ages. . . . "

Overall infant mortality in Burma for 1977, the approximate midpoint of the 1973–1983 intercensal period, was 101 infant deaths per 1,000 live births. There are large regional differences: In rural areas, the infant mortality rate was 107 per 1,000, compared with 70 per 1,000 in Rangoon City, the Burmese capital. The infant mortality rate in all other urban areas was 87 per 1,000. In Rakhine State, a rural region, the infant mortality rate reached 139 per 1,000 in 1976.

The author concludes that although there was a substantial decline in child mortality between 1973 and 1983, any evidence of a fertility decline is spurious. He believes that among the less educated rural population, fertility is unlikely to decrease in the near future and, in fact, may increase as health programs are expanded. In addition, he cautions that although governmental efforts to promote family planning have the effect of lowering fertility, a simultaneous improvement in maternal health may offset that effect; he adds, however, that "in urban areas, one can expect further reductions in fertility resulting not only from the rising age at marriage, but also from better education and perhaps the availability of contraceptives."—*P. Rind*

Reference

1. M. I. K. Maung, *Estimates of Burma's Mortality, Age Structure, and Fertility, 1973–83*, Papers of the East-West Population Institute, No. 116, East-West Center, Honolulu, June 1990.

Better Access to Health Services in Nicaragua Lowered Infant Mortality

Infant mortality in Nicaragua has declined steadily since the 1970s. An analysis of possible factors leading to this decline, including income, children's nutrition, breastfeeding, literacy, immunization, and access to health services, suggests that an increase in the number of workers at primary health care facilities and the resulting improvement in access to health services had the most significant effect.[1] Political changes in the country may have also led to improved primary health care.

Researchers from Great Britain and Nicaragua analyzed data on infant mortality from five different sources: the 1971 census, the 1978 National Demographic Survey of Nicaragua, the 1985 Sociodemographic Survey, the Sentinel Sites Study of 1986 (which collected data on 34 selected survey areas), and the national system of vital statistics. When combined, these data show that infant mortality began to fall in the 1960s at a slow rate, declined more sharply in the early 1970s and was continuing to decline at a rapid pace in 1986. A weighted average of these data shows that the rate fell from around 130 deaths per 1,000 live births in 1970 to about 70 deaths per 1,000 in 1985. On average, the infant mortality rate declined by 4.7 deaths per 1,000 for each year from 1974 to 1986. (There is no evidence that the decline in infant mortality was any greater in rural areas than in urban areas.)

The researchers then examined trends in factors that might have led to this decline. Data on gross national product (obtained from the National Autonomous University of Nicaragua) revealed that the drop in infant mortality did not correspond to a rise in the standard of living; per capita gross national product remained steady in the 1970s and fell sharply in the 1980s. Data on child nutritional status were obtained from three nationwide surveys, in 1966, 1977–1978 and 1986; data on food production and caloric intake were taken from World Bank and United Nations Food and Agricultural Organization statistics, respectively. In 1966, 36 percent of children under age five were found to be stunted (i.e., below two standard deviations in the ratio of their height to their age). In 1977–1978, this figure was 26 percent, and in 1986 the corresponding rate of stunting in children aged 6–9 years was 22 percent. However, food production in 1986 was only 70 percent of the 1967 rate; the number of calories consumed per capita also dropped during this time.

The prevalence of breastfeeding was estimated from two ad hoc surveys in Managua: In 1977, 58 percent of mothers in Managua breastfed their children for at least six months; in 1988, only 33 percent of children aged 3–5 months still received breast milk. To determine the extent of maternal education, literacy levels were derived from national surveys and censuses from 1950–1985. Illiteracy in the general population decreased from 62 percent of all men and women in 1950 to 25 percent in 1985. Rates of children's deaths related to diseases that are preventable through immunization (taken from the Latin American Center for Demography) were compared with estimates of vaccination coverage from Nicaraguan Ministry of Health figures. Deaths from these diseases among children ages 1–4 dropped from 21 per 10,000 in 1975 to three per 10,000 in 1986. Immunization coverage rose sharply in the early 1980s, probably because of increased numbers of voluntary health workers participating in national immunization campaigns.

On some other public health indicators, Nicaragua does not rate highly. In 1981, the number of urban households with access to clean water was almost unchanged from the number prior to the 1972 earthquake, and latrine construction, which had averaged 4,590 annually in 1974–1978, was still barely able to keep up with the growth in the rural population.

Analyses of the country's health system from 1960–1985 were reviewed and combined with statistics from the public and private health sectors. Prior to the 1960s, Nicaragua's health system has always been concentrated in the cities, especially Managua. A 1965 loan from the U.S. Agency for International Development helped establish more health centers and outreach programs in rural areas. Additional primary health care services were established in the early 1980s. There was also a drop in the availability of hospital care in the early 1970s; the number of hospital beds peaked at two per health professional in 1971 and has since been declining. Insurance coverage was also low, but has risen somewhat over the years, from four percent of the population in 1963 to eight percent in 1978 and 10 percent in 1980. The number of doctors and nurses per 10,000 inhabitants increased from five doctors and two nurses in 1970–1974 to six doctors and three nurses in 1975–1979 and to slightly more in 1980–1984. The increase in personnel was reflected in rising rates of hospital discharge and in increasing outpatient consultations, especially in emergency rooms.

The authors suggest that the most plausible explanation for the decline in infant mortality in Nicaragua is the change in health services that began in 1974. The decline in the number of hospital beds meant that more resources were allocated to ambulatory and preventive care. The shift away from hospitals was the result of a combination of factors, including devastation from the 1972 earthquake, rapid population growth and constraints on public spending. At the same time, health professionals were being trained at a rate surpassing that of the population growth. The political turmoil during the last years of the government of Anastasio Somoza and the years following the 1979 insurrection also may have contributed to this trend. The authors of the report suggest that late in his regime, Somoza spurred investment in social programs, and the Sandinista National Liberation Front, which took power after the insurrection, continued and expanded these investments. The researchers note that Nicaragua's new government, elected in early 1990, "is committed to contraction of public expenditure," and that "the effects of any change in policy on child health and survival will provide an opportunity to explore the validity of the explanations advanced" in their study.

The investigators also point out that Nicaraguans generally prefer manufactured pharmaceuticals to traditional herbal remedies (although both are often used), are quick to change treatments when no improvement occurs and are sensitive to the progress of their children's illnesses; hence, when health services became more widely available in the 1970s and 1980s, the population quickly took advantage of them.—*R. Turner*

Reference

1. P. Sandiford et al., "Why Do Child Mortality Rates Fall? An Analysis of the Nicaraguan Experience," *American Journal of Public Health*, **81**:30, 1991.

Misconceptions About HIV Transmission Are Common in Kinshasa

Awareness of AIDS is almost universal in Kinshasa, Zaire, according to data from a 1988 study.[1] However, some misconceptions about the disease are common: Almost half of men and women do not know that the AIDS virus cannot be transmitted by mosquitos, nearly half of men and nearly two-thirds of women believe there to be a cure for the disease and less than half of women know that condoms help protect against transmission of the human immunodeficiency virus (HIV). Only small proportions of those surveyed have ever used condoms, and less than two percent reported always using them with their spouses.

Researchers interviewed 3,140 men and 3,485 women in Kinshasa between January and September 1988 to investigate AIDS-related knowledge and contraceptive and sexual behavior. A random sample of women aged 15–49 and men aged 20–59 was taken from among 24 administrative zones of Zaire's capital. The mean age of the men was 33; that of the women was 27. The majority of both the male and the female respondents had a secondary education (61 percent of each), but the men were more likely than the women to have attained higher levels of schooling (20 percent vs. three percent). About half of the men were married and had only one wife (53 percent); four percent had two or more wives, two percent were in consensual unions and 40 percent were separated, divorced, widowed or never-married. Fifty-two percent of the women were married, 10 percent were in consensual unions and 38 percent were separated, divorced, widowed or never-married.

AIDS-Related Knowledge

Knowledge of AIDS was almost universal—99 percent of men and 96 percent of women had heard about the disease. There were, however, some important misconceptions about its nature and the ways in which the virus can be transmitted. For example, 29 percent of men and 38 percent of women either believed that one can get AIDS by working beside an infected person or did not know whether that was possible. In addition, almost half of the respondents thought that mosquitos can transmit the AIDS virus. Most of the men and women knew that symptoms of AIDS include persistent diarrhea and extreme weight loss, but a majority were unaware that recurrent fever and prolonged fatigue may also be symptoms. Almost 80 percent of the men and 73 percent of the women knew that individuals with multiple partners are at greater risk for contracting the virus than are those in monogamous relationships. However, only 42 percent of women were aware that condoms can prevent HIV transmission. When asked if there is a vaccine against AIDS, a surprisingly high proportion of respondents said there is one or did not know (41 percent of men and 57 percent of women); similarly, 48 percent of men and 32 percent of women either believed there to be a cure for the disease or did not know. Most men and women believed themselves to be at low or no risk for contracting AIDS.

By conducting a multivariate regression analysis to determine associations between background characteristics and knowledge about AIDS, the investigators found that men and women who received a high score on an AIDS knowledge test were likely to be more educated, to have known someone who died of AIDS and to be of higher socioeconomic status. AIDS knowledge was also positively associated with the number and length of messages regarding AIDS that the respondent had heard through the media. Non-Christian men and women were less knowledgeable about AIDS, as were rural women.

Almost one-half of the male respondents and almost two-thirds of the female respondents believed themselves to be at no risk for AIDS. Men and women were more likely to view themselves as at risk if they had more education, were of higher socioeconomic status, knew someone who had died of AIDS, had heard more media messages about AIDS, or had multiple or extramarital sexual partners. In addition, men were more likely to perceive themselves as at risk if they were younger or were either Catholic or Protestant. Women with one steady partner were more likely than women without such a partner to view themselves as at risk for AIDS.

Sexual and Contraceptive Behavior

Among men and women who had had intercourse, the mean age at first intercourse was 17 and 16 years, respectively. Sixty percent of women and 66 percent of men said they had had sex during the previous month; those who had done so had had intercourse on 1.3 days during the prior week, on average.

Almost one-quarter of married men (compared with one percent of married women) said they had had extramarital intercourse in the six months preceding the interview. About half of those men and nearly all of the women claimed they had been with only one extramarital partner.

Younger men, those who were more educated, those of higher socioeconomic status, those who had lived in an urban area during adolescence and those who believed there to be a vaccine against HIV were all more likely to have engaged in extramarital intercourse. Young age and urban residence during adolescence were apparently associated with an increased likelihood of extramarital sexual activity among women as well.

The respondents were all asked about their knowledge and use of condoms. Knowledge was greater among men than among women, and married women were more likely than single women to have heard of this method. Only 12 percent of married men had ever used a condom with their wives. Although eight percent of married men and seven percent of married women said they were currently using condoms, less than two percent of either men or women said they regularly did so. Pregnancy prevention was the primary reason given for using a condom with a spouse, followed by prevention of sexually transmitted diseases and prevention of AIDS.

Kinshasa residents are more likely to use a condom with an extramarital partner than with their spouse: Twenty-four percent of the men who had sexual partners other than their spouse and 12 percent of comparable women said they used a condom with that partner. Among the men who said they used a condom with an extramarital partner, 35 percent did so all the time and 15 percent did so most of the time. The prevalence and frequency of condom use among unmarried men was similar to that among married men involved with an extramarital partner.

When asked about their beliefs about condoms, more than 52 percent of the men said they thought that condoms tear easily, can remain in the vagina after sex and can diminish sexual pleasure. Unmarried men had slightly more favorable attitudes toward condoms than did married men. Women also tended to view condoms negatively, with 30–50 percent mentioning the above problems.

Men with a positive attitude toward condoms were more likely to be young, to have engaged in extramarital activity during the preceding six months and to have had no steady partner. Those who viewed condoms positively were also more likely both to use condoms and to be aware of their value in preventing HIV.

The researchers, concerned about the many misconceptions they found among the men and women of Kinshasa regarding both AIDS and condoms, believe that their findings can provide areas of emphasis for an ongoing educational campaign. Particularly important are the misconceptions about how HIV is transmitted, the belief that there is a cure for AIDS and the negative perceptions about condoms. The investigators also stress the importance of aiming educational campaigns at teenagers as well as adults, since about one-half of adolescents in Zaire have had sexual intercourse by age 17.—*P. Rind*

Reference

1. J. T. Bertrand et al., "AIDS-Related Knowledge, Sexual Behavior, and Condom Use Among Men and Women in Kinshasa, Zaire," *American Journal of Public Health,* **81:**53, 1991.

Compliance with AID's Mexico City Policy Has Been Careful and Complete, Recent Analysis Concludes

International family planning organizations have complied carefully with the policy forbidding recipients of U.S. population funding from supporting nongovernmental organizations that perform or promote abortions, according to an evaluation conducted for the U.S. Agency for International Development (AID).[1] Grantees have also "taken reasonable steps to verify that their subgrantees are in compliance" with the policy (known as the Mexico City policy); in fact, the evaluators describe a number of cases in which subgrantees have interpreted the policy too conservatively and have halted activities that were not in violation of the policy. The report recommends several changes in the way the policy is explained. The director of AID's Office of Population had earlier given an official sworn statement offering clarifications of what activities are or are not permitted.[2]

The Mexico City policy, so named because it was announced at the United Nations–sponsored International Population Conference in Mexico City in 1984, says that the United States will not contribute to family planning programs that include abortion services. Thus, the U.S. government required national programs to segregate U.S. funds in special accounts separate from any abortion-related expenditures, and declared that it would not "contribute to separate nongovernmental organizations [that] perform or actively promote abortion as a method of family planning." A standard clause was later inserted into all agreements between AID and nongovernmental organizations, stating that AID funds may not be used to finance or support activities supporting the use of abortion "as a method of family planning" (i.e., to space births or terminate unwanted pregnancies).

Although the clause forbids grantees and subgrantees from actively advising women about abortion, it does permit recipients in countries where the procedure is legal to discuss abortion with a pregnant woman if she brings up the subject and says she intends to obtain an abortion (termed "passive" referral). It also allows recipients to counsel on abortion or perform the procedure when a woman's life is endangered and to treat women suffering from the effects of illegal abortion. In addition, the clause states that "epidemiologic or descriptive research to assess the incidence, extent or consequences of abortions is not precluded."

In 1990, AID commissioned a study to determine if grantees and subgrantees understand and have been complying with the terms of the Mexico City Policy, and what the policy's impact has been on the operation of family planning programs.

DIGEST

The activities of five major grantees (or cooperating agencies) were reviewed during the course of the study.* Staff members at these agencies were interviewed to determine how they were monitoring subgrantees' compliance with the policy, and files were examined for the documentation required by the clause. The investigators also made field visits to 49 subprojects—12 in Brazil, 10 in Pakistan, eight each in Bangladesh and Kenya, seven in Turkey and four in Egypt. More than 100 clinic staff were interviewed in depth during these visits.

The investigation revealed that all of the cooperating agencies were taking "reasonable steps" to ensure their compliance with the Mexico City Policy. In addition, most subgrantees had instituted procedures to help their staffs understand and comply with the policy, and nearly all were also carrying out some sort of informal internal monitoring, usually by the director of the subproject or by a senior staff member. The investigators observe that "all of the subprojects reviewed were found to be in complete compliance with the Mexico City Policy; there was no indication that any of the subprojects is carrying out or promoting abortion."

Most senior personnel at the cooperating agencies "had a good understanding of AID's procedures for implementing the Mexico City Policy," the investigators comment, although some mentioned that the clause's language was so complex that they had had to seek the help of a lawyer to interpret it. And while senior staff of the subgrantees also generally understood the policy, the investigators observe that "most do not have a grasp of the fine details." For example, one-third of those interviewed did not know that under some circumstances they are allowed to refer patients for abortion without violating the policy.

The investigators also note that although the Mexico City Policy has had little effect on the operation of most AID-funded projects, some project staff have "overreacted" to the restrictions. In some cases, program managers in countries where abortion is legal have prohibited clinicians from ever discussing abortion with clients, even when the client brings up the subject: "One subproject director explained these prohibitions by stating that if any exceptions were made, 'Someone might someday say that we are in violation of the clause because of something one of our staff members did or said with regard to referrals. It is better to limit all referral activities than be put in this situation.'"

Another unanticipated effect of the policy has been on the monitoring of health-related information. Some clinics in Bangladesh and Pakistan have stopped recording abortion-history data on a client's medical form, even when the information is volunteered by the woman, apparently because of fear over the potential impact if the word "abortion" appears on a client's records. In addition, an organization in Bangladesh that before the announcement of the Mexico City Policy had been collecting data on abortion trends has ceased to do so, assuming that such activities violate the policy. Other subprojects have instructed employees never to discuss abortion, even on their own time, and have forbidden staff physicians from performing abortions in their private practices or anywhere else outside the clinic. Finally, in some countries, the policy has hindered cooperation between nongovernmental organizations that receive AID funds and others that do not and that are involved in abortion-related activities.

The investigators conclude by recommending several clarifications of the Mexico City clause in AID agreements. First, they recommend that it be "revised to clarify what is permitted in important areas, such as research and the treatment of septic abortion cases." In addition, they say, the clause might be modified to read that if a grantee or subgrantee were to violate the policy inadvertently, it would be permitted to correct the problem before having its agreement terminated. The investigators also urge cooperating agencies to give more help to subgrantees in understanding the requirements of the clause. Finally, they recommend the provision of a "short, easy-to-read publication providing examples of what is and is not permitted under the standard clause. . . . This publication should 1) be targeted toward subproject administrative and clinic personnel, 2) be printed in a number of languages, and 3) cover a number of subjects related to the policy, e.g., monitoring, referral and equipment procurement."

On June 15, 1990, Duff G. Gillespie, director of the Office of Population of AID, gave a sworn statement in response to testimony in a U.S. court case challenging the constitutionality of the eligibility clause used to implement the Mexico City policy. Gillespie explained that the purpose of the policy was to "prevent foreign abortion advocates from representing the United States in foreign countries by excluding them from AID's population assistance program and allocating federal funds to foreign nongovernmental organizations whose activities are consistent with the values and principles the President has decided to promote."

Gillespie further noted that U.S. recipients of federal monies may fund foreign nongovernmental organizations so long as abortion-related activities are limited to those "that would not make foreign nongovernmental organizations ineligible under the clause: counselling and referrals when the life of the mother is threatened or in cases of rape or incest; abortion research; training and equipment to deal with incomplete or septic abortions, which are health problems at that point and not family planning actions; [and] postabortion counseling for women who have an obvious need for contraceptive family planning services." The director also observed that recipients' involvement in abortion-related activities depends to a large extent on the legality of abortion in a particular country: In countries where abortion is legal, agencies wishing to be involved in abortion can cooperate with governmental organizations (which are not affected by the Mexico City policy) using non-AID funds; in other countries, abortion-related activities would violate the law and therefore could not be undertaken responsibly.—*M. Klitsch*

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*The Association for Voluntary Surgical Contraception, the Centre for Development and Population Activities, Family Health International, International Planned Parenthood Federation—Western Hemisphere, and The Pathfinder Fund.

References

1. J. Blane and M. Friedman, *Mexico City Policy Implementation Study,* Population Technical Assistance Project, Occasional Paper No. 5, Arlington, Va., Nov. 1990.

2. D. G. Gillespie, "Supplemental Declaration of Duff G. Gillespie," in re *The Pathfinder Fund et al.* v. *Agency for International Development et al.*, U.S. District Court for the District of Columbia, Civil Action No. 89-0133, Washington, D.C., June 15, 1990.

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Family Planning in Mali

Sterilization Among Women in Zaire
Effectiveness of the Symptothermal Method
Providing Contraception at a Mine in Peru

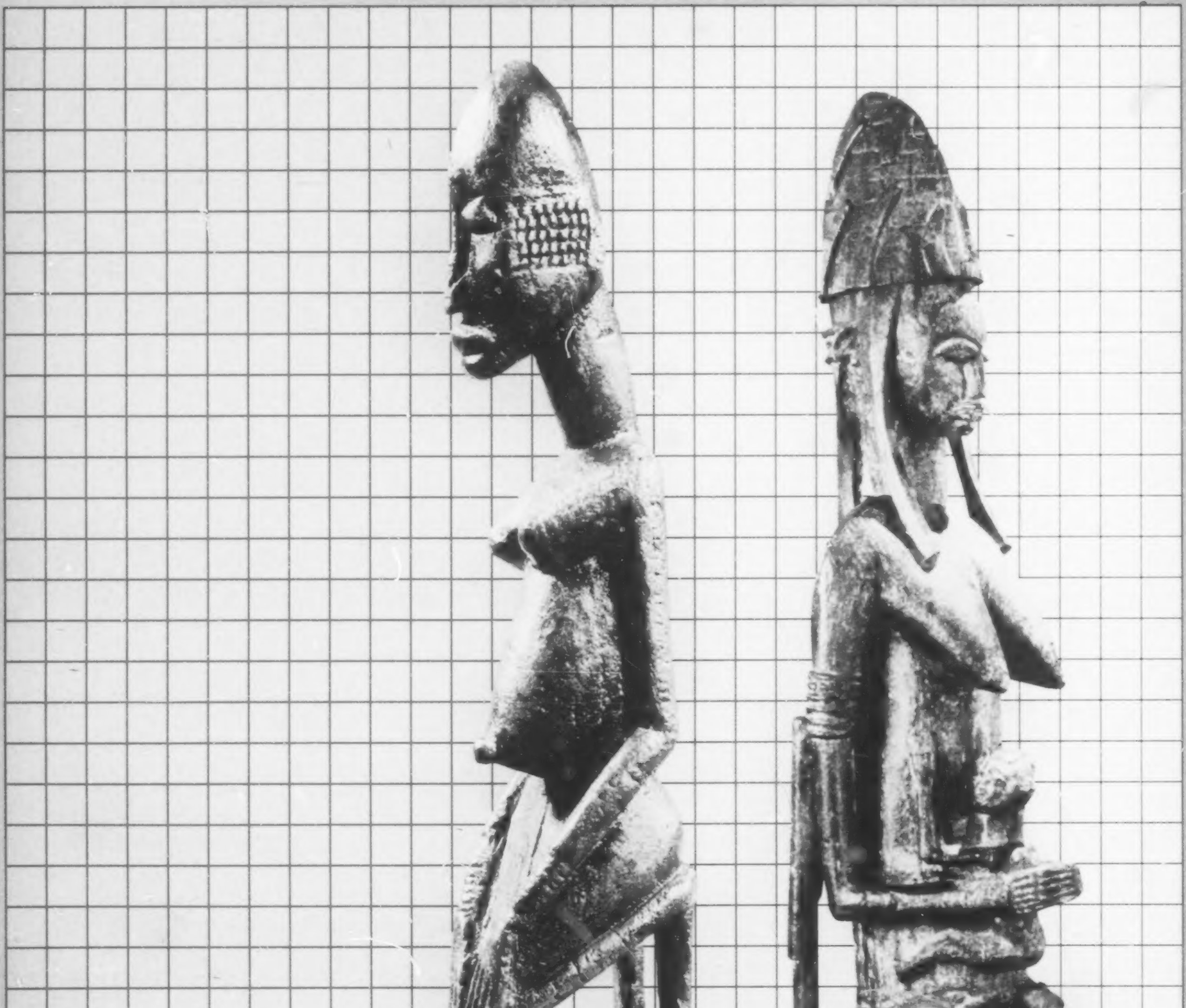

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Table of Contents

Page

Update 82

Articles

Family Planning in Bamako, Mali — Francine van de Walle and Mariam Maiga 84
Costs and Benefits of Implementing Family Planning Services at a Private Mining Company in Peru — Karen G. Foreit, Delia Haustein, Max Winterhalter and Ernesto La Mata 91
Use-Effectiveness Among Users Of the Symptothermal Method Of Family Planning — Robert T. Kambic, Ronald H. Gray, Richard St. Mart, Claude A. Lanctot and Mary C. Martin 96
Social and Psychological Aspects Of Tubal Ligation in Zaire: A Follow-Up Study of Acceptors — Jane T. Bertrand, Chibalonza Kashwantale, Djunghu Balowa, Nancy C. Baughman and Chirhamolekwa Chirwisa 100

Comment

South Asia's Future Population: Are There Really Grounds for Optimism? — Richard Leete and Gavin Jones 108

Books in Review

The Population Wars — Rodolfo A. Bulatao 114

Digest

Most Zimbabwean Men Approve of Family Planning After the First Birth 115
Thai Children from Small Families Generally Attain More Education 116
Paraguay DHS Reveals Moderately High Fertility and Low Child Mortality 117
Early Marriage and Childbearing Remain Common in Developing World 119

Corrections 95

The wood fertility sculptures pictured on the cover are from Mali. The pregnant woman is of Dogon origin; the photograph, courtesy of the Center for African Art, New York, is by Jerry L. Thompson. The mother and child is a Bamana figure, from the collection of The Metropolitan Museum of Art, New York; it was photographed by Lee Boltin.

UPDATE

Risky Sex in Nigeria

Premarital and extramarital intercourse are relatively common among Yoruba men and women living in the Ekiti District of Nigeria, according to the results of an intensive, in-depth survey, with the men reporting consistently more sexual partners and more frequent intercourse than the women.[1] Researchers asked 200 hundred men and 200 women about their past and present sexual behavior. Forty-nine percent of rural men and 36 percent of urban men had had five or more premarital sexual partners, compared with 21 percent of rural women and 24 percent of urban women. (Thirteen percent of rural men and 19 percent of urban men said they had had too many premarital partners to remember.) Forty-seven percent of rural men and 41 percent of urban men had had at least three different sexual partners in the preceding year, as had 22 percent of rural women and 15 percent of urban women. The researchers also estimate that 55–60 percent of men in monogamous unions and 27–41 percent of women in monogamous unions had had at least one nonmarital partner over the year preceding the study. Overall, about 60 percent of all of the men and about 40 percent of all of the women were having intercourse with more than one partner around the time of the interview. The investigators comment that this "level of sexual networking . . . is so high that the society is dangerously exposed to sexually transmitted disease."

1. I. O. Orubuloye, J. C. Caldwell and P. Caldwell, "Sexual Networking in the Ekiti District of Nigeria," *Studies in Family Planning*, **22**:61, 1991.

China's "Missing" Girls

Females are underrepresented in all second and higher order births in China, according to a recent analysis, especially when these births occur without official approval.[1] Researchers using three large independent data sets analyzed the ratio of reported male births to reported female births, and confirmed that the sex ratios reported for China over the past decade are well in excess of the expected ratio of 105 or 106 males per 100 females. For example, a 1988 survey revealed sex ratios of 111 and 112 per 100 over the period 1985–1987; the sex ratio was about 107 per 100 for first births but grew to 113 per 100 for second births and 118–119 per 100 for third and fourth births. After an exhaustive analysis of a variety of data sources, the investigators conclude that about half of the "missing" girls are given up for adoption by their biological parents and are not reported as live births to authorities. In addition, according to the researchers, the sex ratio of infant deaths (114 male infant deaths per 100 female infant deaths) is substantially lower than the normal ratio of 130 per 100, "implying some excess female infant deaths."

1. S. Johansson and O. Nygren, "The Missing Girls of China: A New Demographic Account," *Population and Development Review*, **17**:35, 1991.

Do Babies Need Extra Water?

Even in tropical areas, infants who are being exclusively breastfed do not need to be given additional drinks of water to prevent dehydration; in fact, babies who are given supplemental water appear to consume less breast milk.[1] An in-depth study conducted in India during the summer involved 45 infants about 10 weeks old; 22 were breastfed and given supplementary water and 23 were breastfed but were not given additional water. (The former received about 11 percent of total fluids as water.) There were no significant differences between the two groups in the concentration of their urine, in their weight change or in their body temperature. However, the infants who received water supplements consumed significantly less breast milk than the infants who received no water. The researchers conclude that "exclusively breastfed infants can adequately maintain water homeostasis during summer months. . . . Water supplementation is unnecessary and offers no additional advantage for maintaining hydration status."

1. H. P. S. Sachdev et al., "Water Supplementation in Exclusively Breastfed Infants During Summer in the Tropics," *Lancet*, **I**:929, 1991.

Abortifacient Requests in Paraguay

Many pharmacies in the Paraguayan capital of Asunción receive 10 or more requests each week for abortifacients, and women who seek them are much more likely than contraceptive customers to be unmarried or from poor neighborhoods.[1] Researchers examined the frequency with which abortifacients (some of them harmless and ineffective, some effective, and some effective but dangerous) were sought at 80 pharmacies in and around Asunción. They found that employees at 45 percent of the clinics reported that they received at least 10 such requests each week. After comparing 56 women who purchased contraceptives at these pharmacies with 51 who purchased abortifacients, the investigators found that women from low-income neighborhoods were almost five times as likely as others to buy an abortifacient; furthermore, unmarried women were nearly three times as likely as married women to do so. The researchers attribute the busy market for abortifacients and pseudoabortifacients in Asunción in part to the absence of any government-sponsored contraceptive services.

1. N. K. de Oddone et al., "Paraguayan Pharmacies and the Sale of Pseudo-Abortifacients," *Journal of Biosocial Science*, **23**:201, 1991.

Why Women Breastfeed

The most important factors affecting whether a Filipino woman breastfeeds her baby appear to be socioeconomic, according to a new analysis of breastfeeding behavior.[1] Data were collected on 3,005 women who

Update was compiled and written by Michael Klitsch, editor of *Family Planning Perspectives*.

gave birth at some time during a one-year period in 1983 and 1984; more than 90 percent elected to breastfeed their baby. A multivariate analysis revealed that the strongest determinants of whether a woman intended to breastfeed her baby were personal and economic factors: Better-educated Filipinos were significantly less likely to intend to breastfeed, as were women with relatively higher family income, those who had worked during pregnancy and those whose husband was relatively highly educated. Although women who were exposed to mass-media campaigns promoting breastfeeding were significantly more likely to intend to breastfeed, those who had heard about formula feeding from the mass media were no more or less likely to intend to breastfeed. More highly educated women were also significantly less likely to have actually breastfed their baby, as were women who gave birth at a private health facility. The investigators conclude that "most of the factors that result in the largest predicted reductions in the likelihood of breastfeeding seem to be related to family economics."

1. J. F. Stewart et al., "Influences on the Extent of Breast-Feeding: A Prospective Study in the Philippines," *Demography*, 28:181, 1991.

Maternal and Child Health in Bolivia

The Bolivian infant mortality rate was about 96 deaths per 1,000 live births during the 1980s, while the overall mortality rate among children under five years of age was 142 deaths per 1,000 live births, according to an analysis of data from the 1989 Demographic and Health Survey. These rates are among the highest seen in Latin America. The survey results also indicated that infant mortality in Bolivia has probably declined by about 20 percent over the past 15 years. Three-quarters of the children who died before age five died at home, and only half had received any medical treatment. The report also reveals that 28 percent of all children under five had had diarrhea sometime in the two weeks preceding the survey, and 20 percent had suffered from an acute respiratory infection during that period. Only 19 percent of children 1–2 years old were fully immunized. Fifty-three percent of women who gave birth between 1984 and 1988 received no prenatal care, and 60 percent gave birth at home, almost all with no doctor, nurse or midwife present. The maternal mortality rate for the period 1975–1988 was estimated at 332 maternal deaths per 100,000 live births.

1. A. E. Sommerfelt et al., *Maternal and Child Health in Bolivia: Report on the In-Depth DHS Survey in Bolivia, 1989*, Institute for Resource Development/Macro Systems, Inc., Columbia, Md., 1991.

Affordable, High-Quality Care

Over the past decade, a single clinic in Dhaka founded by the Bangladesh Women's Health Coalition has grown into a network of seven clinics providing a wide range of high-quality health services for extremely low fees.[1] The seven clinics served nearly 100,000 women between July 1989 and June 1990, providing services ranging from contraception and menstrual regulation to child immunization and general adult health care. According to a recent report on the clinics, their success can be attributed in part to their client-oriented perspective and in part to their objective of providing high-quality care. For example, employee salary increases and promotions are determined not simply by the number of patients employees see but also by the quality of the care they dispense. Two clinics in urban areas of Bangladesh charge clients a fee based on a sliding scale, and although the fees are extremely low, the clinics have become about 35 percent self-sufficient. The report's authors conclude that several lessons can be drawn from these Bangladeshi clinics. First, "high quality services are not a luxury. . . . Simple gestures such as treating clients with respect, keeping clinics clean and cheerful and ensuring privacy cost very little yet are highly valued by clients." Other lessons are that counseling entails much more than simply providing information, that satisfied clients will often make use of other services, and that well-treated staff members are more likely to treat clients with respect.

1. B. J. Kay, A. Germain and M. Bangser, "The Bangladesh Women's Health Coalition," *Quality/Calidad/Qualité*, No. 3, The Population Council, New York, 1991.

Reducing Maternal Deaths

Providing high-risk pregnant women with a nearby place to stay during the last few weeks before delivery produced a marked reduction in maternal mortality and a clear improvement in infant health at one Ethiopian hospital.[1] The hospital, serving 300,000 people, set up a 15-bed maternity waiting home (or *tukul*) to provide temporary quarters for pregnant women who lived so far away that they would not be able to reach the hospital in an emergency. The women were usually referred to the tukul by traditional birth attendants or village health workers. In 1987, 151 pregnant women stayed at the tukul, 111 of them because they were judged to be at high risk—72 of these because of an unfavorable obstetric history and 39 because they had experienced complications. A total of 116 traveled from at least 12 miles (20 km) away. Even though the majority of women who stayed at the tukul were considered at high risk, none died during or following delivery; in contrast, 13 women admitted directly to the hospital during 1987 died as a result of childbirth, for a maternal mortality rate of 21.2 deaths per 1,000 live births. The stillbirth rate in the general hospital population (253.5 per 1,000 births) was nearly 10 times greater than it was among women who had stayed at the tukul (28.2 per 1,000). The authors of the report observe that a maternity waiting home located near a rural hospital "is vital where women have to travel long distances, transport is poor and obstetric disasters are frequent."

1. P. Pooven, F. Kifle and B. E. Kwast, "A Maternity Waiting Home Reduces Obstetric Catastrophes," *World Health Forum*, 11:440, 1990.

Teen Pregnancy Programs Worldwide

In the developing world, about two-thirds of programs aimed at preventing teenage pregnancy are operated by nongovernmental organizations, most of which rely heavily on international donors and receive relatively little support from their governments.[1] A total of 103 organizations with adolescent pregnancy prevention programs responded to a mail survey sent in 1989. An analysis of the responses revealed that 66 percent were nongovernmental organizations, 21 percent were governmental projects, six percent were church organizations and seven percent had other sponsors. Thirty-nine percent of the organizations relied on private international organizations for at least some of their funding, 23 percent received government money, 23 percent charged fees, 22 percent were funded by multilateral organizations such as the United Nations or the World Health Organization, 18 percent relied on donations or bequests and smaller proportions received funding from a wide variety of other sources. Eighty-four percent of the programs were serving youths who were in school, and 73 percent were helping young people who were no longer in school. About one-third reported using peer educators in their programs; half said that young people helped develop materials used in their programs, and more than half involved adolescents in implementing the programs. Nearly three-quarters provided contraceptive services to teenagers. The analysts observe that these programs "are doing an impressive job of reaching hundreds of thousands of adolescents around the world. The challenge of the 1990s will be to reach out to the next generation of youth—a generation even larger than today's—at even earlier ages."

1. G. Barker, J. Hirsch and S. Neidell, *Serving the Future: An Update on Adolescent Pregnancy Prevention Programs in Developing Countries*, International Center on Adolescent Fertility, Washington, D.C., 1991.

Family Planning in Bamako, Mali

> **"The area of 'decision-making' on the number of children is a no-man's-land that is generally defined by culture. . . . and it may well be that each spouse believes the other wants more children but that neither bothers to verify that assumption."**

By Francine van de Walle and Mariam Maiga

Summary

Despite the general availability of modern contraceptives in Bamako, Mali, contraceptive practice remains very limited. In-depth interviews with 78 women who had recently given birth revealed a high level of knowledge of methods along with low levels of current and past use. Although women in the sample often complained of being tired of childbearing, they tended to view having children as the purpose of marriage, and the number of children they had as the measure of its success. While the demand for contraceptive use for spacing births may be growing, the demand for methods to limit births appears to be virtually nonexistent.

Introduction

In 1971, the government of Mali decided to establish a two-year pilot project to gather data necessary for the formation of a national family planning program.[1] In doing so, Mali became the first Francophone country in Sub-Saharan Africa to commit itself to such a program. Its stated purpose was to promote maternal and child health. Family planning was meant to be "humane, oriented towards the health of the mother and child, the happiness of the couple, and the well-being of the entire society."[2]

French legislation on family planning had remained in effect in Mali even after the country's independence in 1958, but in June 1972, through a decree on "practices of voluntary birthspacing in the Republic of Mali," the government authorized the practice of voluntary birth regulation, thus abrogating articles 3 and 4 of the French law of July 1920. That infamous law forbade the manufacture, importation, advertising and sale of contraceptives not only in France but in the French colonies.

The Association Malienne pour la Promotion et la Protection de la Famille (AMPPF) established a small family planning pilot project in Bamako, the capital city, in 1967. The objective of educating the population on family planning was controversial; to avoid conflict with the Islamic religious authorities, the government of Mali did not officially acknowledge AMPPF's existence until 1983.[3] Still, an official interest in family planning was developing on the basis of the needs expressed by the urban population. The Union Nationale des Femmes du Mali (UNFM) has played a leading role in promoting the condition of women in the country and collaborated with the AMPPF.

A fundamental premise of the government was the desirability of a "spacing policy;" however, the need for limiting family size, or population control, was not recognized. In spite of the country's annual growth rate of 2.7 percent, the government believed that the levels of fertility and natural population increase were satisfactory and that Mali was still a sparsely populated country.[4] It argued that a larger population could easily be supported by the country's vast size and by what were considered substantially underutilized natural resources. In 1976, 90 percent of the population lived in rural areas, and the government saw no obvious problem of overpopulation at that point.[5] Thus, the Malian family planning program never developed in a context of demographic policy. Its spacing objectives fell within the framework of traditional values and were based on noncontroversial motives of health and family welfare.

Today, family planning is one of the health services provided by the government, and its growth is linked to the expansion of the network of national public health facilities. *Le planning*, as it is called in Bamako, is integrated into the 11 Protection Maternelle et Infantile units (PMIs), the equivalent of the Maternal and Child Health centers of Anglophone Africa. These units are established in every neighborhood of Bamako as well as in the regional towns. There are also a number of small private family planning centers in Bamako and in the rest of the country so that, according to the project coordinator of AMPPF, "these centers provide an opportunity for every person to freely find a family planning service close by and at the desired time."[6]

Besides the PMI units, which provide contraceptives free of charge (pills, injectables and IUDs), town pharmacies sell contraceptives (condoms and pills) to people with a medical prescription. In addition, single and divorced women, married men (usually having extramarital affairs) and older students (in high school or university) usually manage to buy contraceptives in urban pharmacies without medical or parental authorization. Finally, a parallel market exists for the sale of modern contraceptives (mostly outdated formulations of the pill) in the open markets of Bamako, where they form part of a pharmacopoeia that includes traditional contraceptives and aphrodisiacs as well.

Statistics for 1972–1980 provide some insight into the evolution of family planning in Mali.[7] A total of 16,299 clients of both sexes visited the facilities over that period but data on 989 clients (six percent) were unusable. The resulting number of family planning clients in the country was 15,310, with 80 percent living in Bamako. Among these clients were 439 men who were given condoms and 238 women who were treated for sterility. It is likely that some of these persons were in fact counted several times in the available statistics.

Francine van de Walle is research associate at the Population Studies Center, University of Pennsylvania, Philadelphia. Mariam Maiga is a staff member at the Centre d'Etudes et de Recherche sur la Population pour le Développement (CERPOD) in Bamako, Mali. The qualitative data for this article were collected under a grant from the Population Council's International Research Awards Program on the Determinants of Fertility, funded by the U.S. Agency for International Development. Francine van de Walle and Nassour Ouaidou, Director of CERPOD, were the principal investigators. The authors gratefully acknowledge the comments and suggestions of Cheikh Mbacké, Dominique Meekers and Etienne van de Walle on earlier drafts of this article.

Contraceptive discontinuation rates are difficult to estimate among these users. About half of the women were reported to have discontinued using their particular method or to have abandoned the use of contraceptives altogether; about 31 percent of those discontinuing or abandoning use had done so within three months of the initial visit and 77 percent within the first year. Among the other half, it was not clear what proportion of women still visited the clinic regularly and what proportion represented women with inactive files.[8]

By far the most widely used method in 1972–1980 was the pill, followed by the IUD. A large part of the demand for contraceptives in Bamako came from single women, mostly aged 20–24, who wanted to avoid pregnancy before marriage (48 percent of users). Married women were using contraceptives to space births rather than to stop childbearing. Abortion is illegal in Mali unless the pregnancy endangers the life of the mother. Although punishable by fines and imprisonment, according to articles 170 to 172 in the Code Pénal Malien,[9] abortion is thought to be widely practiced among young single women and particularly among school-age girls. However, a nationwide study of hospital facilities that was conducted in 1981–1982 revealed neither a high incidence of abortion nor a high demand for contraception.[10] That one-year study found 113 women who had been admitted for complications of induced abortions. Of these, 81 percent were unmarried, 45 percent had had a secondary education or more and 38 percent were students.

Another survey conducted in Bamako showed a similar low level of contraceptive prevalence. For example, among women attending the Hamdallaye maternity clinic in Bamako in 1980–1982, only 3.6 percent had used a contraceptive before their last pregnancy and for the most part, these women had had some education. However, 30 percent overall indicated that they intended to use contraception after their current delivery.[11]

The authors of the report on the 1987 Demographic and Health Survey (DHS) for Mali believe that fertility had recently been declining.[12] If so, is this the result of family planning activities? Their impact can be evaluated very roughly, based on the official statistics from the family planning program (which cover the nine-year period between 1972 and 1980) and the 1976 census results (which counted 419,239 people in the urban agglomeration of Bamako[13]). Assuming that the city's population remained close to the average for the nine-year period covered by the service statistics, that women in their childbearing years made up one-fourth of the population of Bamako, and that the 13,000 users in that city remained in the service for one year on average, less than 1.5 percent of women in Bamako were protected from the risk of conception over the period. This proportion is hardly enough to have had much of an impact.

Was the limited use of family planning services in Bamako a function of an inadequate supply of contraceptives or of weak public demand? Our impression of the family planning facilities we visited informally was one of openness and availability. Clients were usually served promptly, the facilities were well supplied and the staff was friendly. The network of clinics seemed to be sufficient for the needs of the population. Family planning centers, which women could use for both family health and family planning, were advertised well and were usually easy to find, even for new residents.

A 1984 statement by Abdoul Karim Sangaré, then president of the AMPPF, would seem to contradict our impressions. He referred to "the lack of information about family planning services, the prevalence of a great deal of incorrect information and the widespread opposition of the male partner as the three most formidable cultural barriers to fertility control in Mali."[14] As in other parts of Africa, there is a conflict between "demand" and "supply" explanations for the low prevalence of contraceptive use, and by extension, for the lateness of the onset of fertility decline. We turn to survey data to shed light on this debate for Bamako.

The Survey

In this article, we use a two-stage approach, combining quantitative data from a large-scale survey with in-depth interviews of a small subsample of respondents. The data come from the Enquête sur la Mortalité Infantile dans le Sahel (EMIS), a large multiround infant and child mortality survey that followed 12,000 women who gave birth in Bamako between April 1982 and March 1983. The survey, which concluded at each child's death or second birthday, was completed in March 1985. Of these women, 6,902 were followed for two full years. (Roughly 30 percent of the women were lost to follow-up, a fact that probably invalidates the mortality data but not the fertility data.) The survey included questions on a number of socioeconomic and cultural variables, as well as on the mother's postpartum behavior and subsequent pregnancies. Questions on knowledge and use of contraception were also asked in the baseline survey.

Our main source for this article consists of the in-depth interviews. Because of the superficial nature of the full survey, we were convinced that a more intensive approach to gathering data on culturally sensitive topics was needed. For example, we were puzzled by the low percentage of women reporting knowledge or use of contraceptives in the EMIS, despite the widespread availability of family planning services in Bamako. In late 1984, when the EMIS multiround survey was coming to a close, we selected for in-depth interviews a random subsample of 80 mothers among those who had already been followed by the EMIS survey for two full years.

The interviews were concentrated in two areas of Bamako: an older neighborhood in the center of the city and an outlying squatter district that had been recently settled. The women were visited at their homes and interviewed at length on the following: postpartum behavior; fertility; desired number of children; spacing preferences; status as a woman, wife and mother; knowledge of contraception; former and current contraceptive use; and intention to use contraceptives in the future. To investigate possible changes in attitude by age cohort, we divided the sample equally between women below age 30 (including seven single mothers) and those aged 30 and older. (It should be pointed out, however, that age reporting was not very precise for most of these women.) The interviews were conducted in Bambara (the main language spoken in Bamako) by one of two women interviewers, accompanied by the first author. Both of the interviewers were high school teachers: The older one was married with six children; the younger one was unmarried with one child. The younger and older cohorts were questioned by the younger and older interviewer, respectively.

We decided to use a loosely structured questionnaire focusing on specific topics and invited the women to talk freely, ask questions and participate. The interviews were recorded on tape and then translated into French by the interviewers and discussed at length the next morning. During the two-month course of the survey, we made some changes in the questionnaire, adding new subjects and eliminating others. During the summer of 1985, we made a last visit to the field to resolve some inconsistencies in the interviews. Although 80 women had been questioned by the end of the project, two interviews were lost due to tape damage.

A caveat is necessary regarding the selection of women in the EMIS survey and, consequently, in the interviews: All the women were fertile, and were eligible because they had had a child. They may have had con-

Table 1. Percentage distribution of women giving birth to a child who survived at least two years, by characteristic and survey sample, Bamako, 1982–1985

Characteristic	Full sample (N=6,902)	Interview sample (N=78)
Age		
<20	21.9	20.0
20–29	50.7	33.4
≥30	27.4	46.6
Education		
No schooling	67.5	73.3
At least some primary	15.9	9.3
At least some secondary	16.5	17.3
Marital status		
Married	86.3	89.3
Single	12.9	10.7
Separated, widowed, divorced	0.2	0.0
Unknown	0.6	0.0
Ethnicity		
Bambara	35.3	29.3
Malinke	16.1	14.7
Fulani	13.7	16.0
Sarakole	10.5	10.7
Others	24.4	29.3
Total	100.0	100.0

siderably more children than similar women who were less fecund or who were practicing contraception (and were thus less likely to have given birth at the time of the survey). Their attitudes toward family planning may have been different from those of the general population. While 78 women are obviously not representative of the population, their responses can contribute a wealth of cultural details not found in quantitative surveys.

Table 1 compares some of the background characteristics of the women selected for the in-depth interviews with those of the 6,902 women in the EMIS survey who had been followed for two full years. Women aged 30 and older were oversampled in the in-depth interviews, while those aged 20–29 were proportionately underrepresented. The similarity of the rest of the results is reassuring. A majority had never gone to school. Uneducated women, who are less likely to have any knowledge of contraceptive methods, were slightly overrepresented in the in-depth sample. Only 17 percent of women in either group had at least some secondary schooling. The great majority were married; most of the single mothers were engaged or hoped to marry the father of their child. Around 40 percent of both samples were in polygamous unions (not shown). An overwhelming majority of the women were Moslem; only a negligible fraction were Christian. In addition, only around seven percent of the women in both groups worked in the modern sector.

Traditional Methods

Local traditions and folklore influence the choice of contraceptive methods. Despite the acknowledged superiority of modern methods, traditional methods survive. In fact, folk methods are often used interchangeably or in tandem with modern ones. Bamako women who visit their mothers in the villages usually return to the capital with traditional contraceptives.

One of the most widely used traditional contraceptives in Bamako is the *taffo*, a cotton belt with knots that is said to owe its magical virtues to the incantations of a marabout (a dervish with supernatural powers). It is tied around the waist of a young girl wishing to avoid pregnancy or of a newly delivered woman who wants to prevent another birth. The *bakan*, consisting of amulets and charms, is also well-known. At the Bamako market these traditional methods sell for U.S. $1–4. Most women who were interviewed had heard of these methods but were skeptical about their efficacy. Four respondents told us they became pregnant while using a belt. The dominant sentiment was more likely to be a suspicion that the seller of the *taffo* was a quack, than a rejection of the principle of traditional contraception:

> The *taffo*, yes I know that, but here they are not good. If I go to the village and my mother ties it, then it is good.—*age 23, three births*

The interest in traditional methods suggests that there is a demand for "natural" methods of spacing births, rather than modern methods, which are perceived as foreign to the culture and dangerous to one's health. We did not expect, however, that rhythm would be widely used in a Moslem community such as Bamako, where it had not been promoted either in the PMI centers or among high school students, as is the case in many Catholic communities throughout Sub-Saharan Africa.* To our surprise, although we did not ask a question on the subject, *le calcul* (counting) was mentioned spontaneously by 11 women in our sample, and five women were currently practicing it. Results from the 1987 Mali DHS have confirmed the relative importance of the rhythm method: A total of 4.5 percent of married women in urban areas were practicing periodic abstinence at the time of the survey and it was the single most popular method. However, fewer than half of users (49 percent) could correctly identify the most fecund days of the menstrual cycle.[15]

Some references to the rhythm method in our survey were clearly based on a nonscientific understanding of the menstrual cycle:

> If you don't avoid pregnancy, you are doing it [seeking pregnancy] on pupose. Myself, after I have my period, I was told to skip 15 days—neither more nor less. By making this computation with the help of God, you have a chance not to become pregnant. . . . They often say "it comes from God, it comes from God," but if you count, you can escape. Adults and informed persons explained that to me, and this when I was still a young girl. In everything, one must pay attention.—*age 38, nine births*

Two other women also had inaccurate interpretations of the cycle, claiming that the fecund days were the three following menstruation, "when the body is cleanest and the uterus is open." Other women in our sample seemed to have had access to accurate information:

> I do *le calcul*. Now I am bleeding. When it is over I will count six days, during those I may go with my husband and my mind is at rest; after those six days I will tell my husband to wait for 13 days. When those are over, and until my "washing" comes, I know that there can be no belly and this until I have my period again.—*age 28, four births*

The women who knew about the rhythm method, especially those who practiced it correctly, were generally more educated; only two of these women had had no schooling and their husbands (a schoolteacher and a veterinarian, respectively) helped them to manage *le calcul*. The reasons most often given for adopting periodic abstinence rather than the widely available modern methods were the lack of side effects, pain, or danger to the health, followed by a desire to avoid losing time in visits to the PMI centers to get contraceptive supplies. Additional advantages were that the method was safe, private and in balance with the women's natural cycle.

As Table 2 shows, Bamako women observe relatively short periods of postpartum abstinence, lasting a median of three months. According to the work of early anthropologists, intercourse taboos following the birth of a child were longer in the past than they are now. For example, Abbé Joseph Henry reported in 1910 that postpartum abstinence lasted upward of three years among the

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*Data from a survey we conducted in 1984 in Bobo-Dioulasso, Burkina Faso's second largest city, indicate that *le calcul* (counting) received more attention than the other family planning methods that had been integrated into the PMI program. *Le calcul* was taught in Catholic secondary schools and had been adopted by some midwives, nurses and physicians who promoted it among their clients.

Bambara people in Mali, observing that "most women gave birth only every four years."[16]

Sexual abstinence is often observed for longer than the norm, particularly among older women and co-wives. Various beliefs about the effect of intercourse on breast milk also persist—for example, that sex will pollute the milk or make it warm, and that the child is thus likely to become sick.[17] Most young women shared this traditional belief but believed that washing themselves after intercourse would resolve the problem:

> I am now giving the breast and . . . if I go with my husband . . . when it is finished, I wash my breast with water from the kettle; it removes the [illegible]. —*age 26, four births*

The "forty days" taboo of Koranic law, after which time the father of the child has the right to resume sexual relations, is a common rule in Mali. Yet intercourse is said to be sporadic during the first months after delivery, when the new mother is confined with her baby and feeds it on demand. She is supposed to rest, gain strength and prepare herself to assume her multiple roles again. Many women also mentioned refusing the husband to avoid becoming pregnant again too soon:

> When I have a baby at the breast, my only method is *le refus* (refusal). I lock my door. He gets nervous, he is upset, then he leaves, but the next morning we have a fight.—*age 43, 14 births*

Refusing the husband is common and the women are given the right to do so. It was the main method of spacing births or avoiding another pregnancy for eight women in our sample; for four of the older women it was the only way they could stop having children. Many women also named sickness or tiredness as another resource, which they said usually worked if not used too often. A 40-year-old mother of nine said that the only contraceptive she knew was to "refuse the husband," and she added that she had done this so many times that she had been discussed in the family council. Most young women, however, felt that it was wrong to refuse one's husband and that intercourse was essential to married life:

> I gave myself to him; consequently, everything he wants is my desire.—*age 19, one birth*

Another said:

> Following the laws of God you cannot refuse the husband's entreaties even if it does not please you at all.—*age 25, three births*

The women we interviewed agreed that it was a difficult decision but that the well-being of the baby was more important than the husband's pleasure. It was much easier to refuse the husband if one had a co-wife or, better, two or three co-wives. As one respondent emphasized, " . . . if there is no other one, when the husband says so, it is a settled matter."

Table 2. Selected childbearing measures among women in Bamako, by survey sample

Measure	Full sample	Interview sample
Median age of mothers at last birth	25	26
Median age of fathers at last birth	36	38
Mean age of mother at first birth	18	18
Mean parity	4	5
Median months of breastfeeding	21	22
Median months of amenorrhea	12	12
Median months of abstinence	3	2

Age was also an important indicator of sexual activity for both women and men. As one 23-year-old with two births said, "It is much easier to space your births if you have an old husband." According to data from both the full and interview samples, the average age difference between husbands and wives in Bamako is about 12 years, and the average woman has her first birth at age 18 (Table 2).

Those couples who are more educated and modern may behave differently: Women working in the modern sector are usually more independent and inclined to make decisions on their own and to refuse their husband when they feel it is not the proper time. (They also ask their husband to have intercourse when desired.) Thus, traditional contraception has evidently not disappeared and, by any account, postpartum abstinence and "refusing the husband" have had an impact on spacing and fertility. The use of traditional contraceptive methods may open the way for the acceptance of more modern, efficient methods.

Knowledge of Modern Methods

The two samples yielded widely different results on the proportions of women who knew about modern methods. In the full EMIS sample, women were interviewed at the maternity clinic shortly after they had delivered; that may be an inappropriate time to discuss means to avoid pregnancy or to investigate whether a mother had tried, without success, to avoid the conception of her newborn. Ten percent of women in the full EMIS sample said they knew about a modern contraceptive and another three percent reported knowing at least one traditional method. Over half of these women (54 percent) had had some secondary education and 21 percent had attended primary school. The percentage of all women who reported having ever used any method was 3.4 percent.

However, knowledge of contraceptives turned out to be widespread among the 78 women who were interviewed in depth two years later (see Table 3, page 88). After they were prompted, only eight women said they did not know of any method. We believe that knowledge had spread somewhat since the EMIS baseline survey and that it continues to spread in Bamako. However, we also believe that the friendly atmosphere of the interviews encouraged openness from the women on a subject still perceived as foreign.

Our method was to make sure that the respondent fully understood the question. We first asked, "Do you know of something to postpone a pregnancy for a while?" If the woman said yes, we asked her, "What do you know?" If she answered negatively, we tried a second question such as, "Haven't you ever heard of something that can help you to wait for a while before another pregnancy?" If the woman said yes, we asked which methods she knew about and whether she had ever used any or was using one now. If she said no, we congratulated her on being able to space her births so well and went on to discuss safer ways of achieving it, such as using contraceptives.

In response to our question, one woman said:

> No, I do not know any method because the methods I know, I do not like them.—*age 40, 11 births*

Knowledge in this sense may be linked to the belief that the method will work for the respondent.

The results of the Mali DHS indicate that 74 percent of married women in Bamako knew of at least one modern contraceptive method.[18] This proportion is lower than that found in our interviews in 1984–1985 where 70 out of 78 women (90 percent) said they had heard of at least one modern method. Furthermore, most of these were able to cite all the modern contraceptives that were available in Bamako (the pill, injectables and the IUD). Interestingly, over half of the women who said they knew of a method did so only after some probing (see Table 3). The following quote illustrates how persistent probing by an interviewer may eventually elicit a response:

> Q. Have you heard of something that prevents a woman from becoming pregnant for a while?
> A. No.
> Q. Haven't you ever met someone who talked to you about that?
> A. No.

Table 3. Number of women who knew about and used modern contraceptive methods and who used traditional methods, by age-group

Age	N	Modern methods*				Use of traditional methods†	
		Knowledge		Use			
		Spontaneous	Prompted	Past	Current	Past	Current
15–19	5	1	4	1	0	4	0
20–24	19	6	11	0	0	7	2
25–29	18	9	7	2	2	8	0
30–34	12	6	5	2	1	5	0
35–39	12	5	7	3	2	5	6
40–44	12	7	2	1	1	2	0
Total	**78**	**34**	**36**	**9**	**6**	**31**	**8**

*Includes pills, injectables and the IUD.
†Includes belts, charms, "refusing the husband" and rhythm.

> Q. You never heard people talking about this on the radio?
>
> A. Eh! . . . I have too much work to listen to the radio. . . .
>
> Q. All right, you told me that you were not pleased to discover this pregnancy, don't you know anything to space the bellies?
>
> A. No.
>
> Q. If somebody would give you something to space your pregnancies, would you be pleased?
>
> A. Yes, . . . I would be pleased.
>
> Q. You just said that you don't know where the Missira PMI clinic is located. Well, you should know it is not far from here. They organize talks there; many women told us that they have been there and they get pills there. Haven't you heard about that?
>
> A. Yes, I have heard about that.
>
> Q. Who told you about it?
>
> A. We, the women, we talk a lot. To tell the truth, I have heard about these pills. . . . —*age 24, three births*

Most women appeared to be more willing to admit having heard of *le planning* than of a specific contraceptive method. They seemed to identify the word when it was cited by the interviewer as a cue. When asked about contraception one young woman answered, "The method that I know is *le planning*." It has become a generic word for a concept that has no simple equivalent in the Bambara language. A majority of women were aware of the existence of *le planning* and were happy to discuss it with us or to learn more about it. Most of them said they were even considering practicing it one day, perhaps after they had had a few more children. The near-complete acceptance of family planning as a option for the future was striking.

It is not surprising that so many women in our survey knew about modern methods of contraception; the topic of birthspacing is widely discussed. In a culture where the traditional length of postpartum abstinence has been greatly reduced, there should be a market for effective and acceptable methods of spacing births. We asked the women who had ever heard of contraception how they first found out about it. Most (34 women) said they learned about family planning from friends and family, usually from an "older sister" (who may have been a real sister, a sister-in-law or a co-wife). Twenty-five women mentioned health services or personnel (PMI units, midwives and nurses) as their source of information. The radio was also a major source: Many knew about the daily morning radio broadcast on the subject of family and health, and the weekly evening program called "The Facts of Life," aired in both Bambara and French. (There is usually at least one radio in the large compounds of Bamako.) As one young woman pointed out:

> How could I not know about *le planning?* Nowadays, they talk about it every day on the radio; and we, the women, we chat about it a lot on our way to the market and at the market.—*age unknown, three births*

Women often walk together to the market in the early morning, and back home again in the afternoon. They spend part of the day engaging in petty trade, taking care of their young children, and chatting about the problems of pregnant schoolgirls, family planning, the price of millet and the health of their children.

Use of Modern Methods

Results from the Mali DHS indicate that six percent of married women in Bamako were using a modern method, and 10 percent a traditional method, at the time of the survey.[19] (The proportions for Mali as a whole were one percent and three percent, respectively.) The DHS report suggests that contraceptive use in Bamako may be significant enough to have influenced the level of fertility. Even if this conclusion is warranted, however, the demand for contraceptives remains low: Among the 70 women in our survey who had some knowledge of contraception (many of them citing four or five modern methods), only six women were using a modern method at the time of the interview, nine women had used a modern method at some time in the past, and after probing, 55 women admitted that they had never used a modern method.

Thus, despite the substantial majority in our sample who were aware of the existence of family planning methods, method use remained very limited. This situation warrants explanation. Only rarely did we encounter a fundamental objection to the principle of fertility regulation on religious grounds. Any religious opposition to contraception based on an ancestors' cult or fear of sterility, as proposed for Africa by John and Pat Caldwell,[20] did not seem to be present in this population. Rather, the very frequent invocation of God appeared to refer to the acceptance of a preordained fate:

> Q. Can you tell why you don't want to go to *le planning?*
>
> A. Why? Isn't this the business of God? If God gives you the child, you bear it, and if He does not give you another one, that's it [His work] too. Why then go for *le planning?—unknown age, seven births*

Other responses, however, were more defiant:

> I am not afraid of the words of God or those of the people, I want to go, and I will go to the PMI center to have contraception. I want to stop having children for good.—*age 34, 10 births*

Although a few women believed it would be sinful to avoid a birth or that their husband would be opposed on religious grounds, these women were in the minority:

> I would like to go to *le planning* . . . but if I tell my husband, he will never accept it.—*age 22, three births*

However, the husband's opposition was more often seen as an obstacle to actually visiting the family planning clinic—where marital approval was required*—than as a justification for nonuse among the women themselves. Moreover, several women were convinced that husbands are always suspicious of their wives:

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*Women can now receive family planning services in Bamako without their husband's authorization.

> I tell you, I do not want to go to *le planning;* I got married only to have children. The men of today, if you don't make children with them, they say that their wife is behaving like a bitch and that is why she is not making children for him.—*age 27, three births*

At least in one instance the religious objection came from the wife herself. One respondent's husband later told the interviewer that he had tried to convince his wife to use family planning:

> Husband: I asked her to go [to *le planning*], and she started being difficult. There is the issue of religion, this is anchored in her mind.
>
> Interviewer: Yes, the issue of religion, this can be an obstacle.
>
> Husband: She says that one should not stop childbearing without the consent of God; this is the problem that we are unable to resolve.—*age 50, 10 children*

As in the results of our research in 1984 in Bobo-Dioulasso,[21] we found a profound lack of communication between spouses in Bamako, a national capital with a higher number of educated couples than elsewhere in Mali. Interestingly, women in Bamako were more likely to have discussed birth control with a female friend, a sister-in-law or a co-wife than with their husband:

> Q. And your husband, does he want many children?
>
> A. In fact, he likes many children.
>
> Q. Do you ask him about a number?
>
> A. He is not the kind of man who talks.
>
> Q. Then, you do not talk with him?
>
> A. Myself, I have never talked about a number of children since I am married . . . he and I we never had such a conversation.—*age 38, nine births*

Although this woman had heard about family planning, she never mentioned it to her husband. She had no idea whether he even knew about contraception, felt she did not dare ask him, and was convinced that he would never allow her to use it even if she did ask him. This example demonstrates the extent of the current lack of communication between spouses as well as the wife's inability to decide about childbearing. (When asked how many children they would like their daughters to have, the women we interviewed disclaimed any involvement in that decision, which they felt should be settled by the daughter and her husband.)

Paradoxically, this vacuum in decision-making coexists with a strong societal norm in favor of spacing births properly. Women who do not space their children adequately are looked upon as bad mothers and are said to be "women who like men too much, so much that they cannot refuse them." Malian mothers are highly conscious of the importance of birthspacing for their own health and their baby's. In fact, birthspacing was the main reason for the expressed interest in family planning:

> *Le planning*, yes, I like *le planning*, I like that very much. When I will have another child, I will do *le planning* until he walks and then, I will stop.—*age 21, three births*

All 78 women were asked about their preferred interval between births. The most commonly mentioned birth interval was 24 months (28 women), followed by 36–48 months (26 mainly older women), 24–36 months (19 women), 48–60 months (four older women) and 18 months (one woman).

A number of women said that they were not interested in contraception since they had had no problem spacing their births naturally. (As mentioned earlier, the official objective of the family planning centers in Bamako is birthspacing.) As Table 2 (page 87) shows, half the women in Bamako breastfed their child for more than 21 months, and the median length of amenorrhea was 12 months among both the full EMIS sample and our interview sample. However, many older and higher parity women reported postpartum amenorrhea lasting up to two years. In contrast, other women believed that their period of postpartum amenorrhea was naturally brief and that they would be at risk of another pregnancy soon after giving birth:

> As soon as the blood of delivery is over, I see my period, women like me are said to be *seremuso*.*—*age 22, four births*

Among women who believed their amenorrheic period was short, the need for spacing was often cited to legitimize the practice of contraception.

The concept of stopping childbearing all together was rarely specified among the women we interviewed. Older women often welcomed the natural end of their childbearing years and seemed to be eager to hasten it. They hoped that the intervals between births would be so long that they would have no more children—or perhaps just one more in a few years. When a desire to end childbearing was clearly expressed, the reasons were mostly related to the woman's health:

> At the hospital, they told me that my uterus was old, but the doctor said that I could still have more pregnancies. I told my husband about it and asked him if I could stop. He did not answer me . . . he is a Wahhabi [member of a strict religious sect].—*age 42, 14 births*

Among the other reasons cited for wanting to stop childbearing were physical exhaustion and old age:

> I refuse the husband, I do not want another child, I am tired, I am old enough to stop, I am beyond the age to have children, I do not want one more pregnancy. I refuse the husband.—*age 43, 11 births*

In one or two cases a conflict with the husband was the motivation for wanting no more children. Economic reasons (hard times, the high cost of living and the burden of large families) were cited as the motivation for spacing as well as stopping births, with no clear distinction between the two objectives.

If the concept of birthspacing is widely accepted, how can the low attendance at family planning clinics be explained? We observed widespread dissatisfaction among former users; discontinuation was widespread among the few women who did use a method; and others said they simply could not remember to take their pills regularly. Furthermore, we found extensive fear of the side effects of modern contraceptives among never-users:

> I went to the PMI center to get pills, I took them for two days but I got dizzy both evenings. I went back to the center to tell them about my dizziness. They checked me and said "Madame, the pills are really not good for you, don't take them anymore." Then, they told me to come back later on to have a *manani* [IUD] put in my body. First, I agreed, but later I got scared; nowadays people talk a lot and many say that the *manani* gets lost in your body and sometimes cuts your intestines. There were too many rumors. . . I left, I went home and did not go back to the PMI center. Then, I got pregnant with this child.—*age 40, 11 births*

Many women said that it was exhausting to be pregnant, that it hurt to deliver a baby and that it took all their strength. Yet the rumored or real inconveniences of modern contraceptives— that they cause nausea, provoke excessive bleeding or may render women sterile in the future—seemed to be enough to deter their use, perhaps because motivation to control family size is not very strong.

**Seremuso* comes from the Bambara *muso* meaning woman, but the etymology of *sere* is unclear; it may have come from the French *serré*, meaning tight as in tightly or closely spaced births. The word *sere* is also used for the disease suffered by children who have been born too closely together, the local equivalent of kwashiorkor (severe malnutrition). On the other hand, women who can easily space their children are called *sigimuso*, with sigi meaning sitting or waiting (as in for the next birth).

Discussion

Seventy-eight women selected from two Bamako neighborhoods are obviously not a fully representative sample of the city's population. They can, however, give us insight into women's opinions and beliefs and thus be more instructive than results from larger and more representative but more general surveys of contraceptive knowledge and practice. Although the women often contradicted themselves—jumping from one subject to another and being imprecise about numbers and dates—they contributed a wealth of unsolicited cultural details. The full EMIS survey and the smaller interview survey were meant to complement each other, with the full survey yielding quantitative data and the in-depth interviews yielding cultural and personal explanations of those data.

Our conversations with Bamako women revealed a great deal about their reproductive behavior and the reproductive decisions they make or, rather, do not make. What light does this evidence throw on some of the current controversies surrounding fertility and the resistance to the introduction of family limitation in Africa? First, Bamako may provide an example of a situation where the availability of contraceptive supplies by itself will not generate a large demand. As far as we could establish, the family planning services were efficient and responsive to the needs of women; our respondents did not complain that clinics were too far away or had long lines or unfriendly staff. While the required permission of the husband was a common complaint, that obstacle had been removed by the middle of our study.

A reference to the European fertility decline might further clarify the issue of supply and demand. European fertility declined early in the 19th century in France and in the late 19th century in other European countries—almost a full century before modern contraception became available. This decline, achieved through abstinence and withdrawal, took place because of strong incentives toward smaller families.[22] In contrast, modern contraceptives are available in Bamako today, and yet their use remains limited because motivation is so limited.

Our interviews revealed both widespread knowledge of contraceptives and family planning services and restricted use of them. Is there a discrepancy between contraceptive knowledge and use, a "KAP-gap," as proposed by Charles Westoff?[23] It seems to us that demand for contraception was lukewarm at best. There seemed to be few women who, in retrospect, were thoroughly dissatisfied with the number of their offspring. No doubt a large number of children (and the prospect of more) was a source of inconvenience and a cause for complaint (which our survey tapped into) but the drawbacks of high fertility were not felt intensively. Although children represented an economic burden, especially in times of hardship, they were also a potential source of economic security. When asked about the advantages of motherhood, most women answered that they expected their children to look after them in old age. For the time being, they felt that children were the very reason for marriage; having children is thus the wife's side of the deal they strike with their husbands. This conclusion confirms the work of several researchers in other Sub-Saharan countries.[24]

Only when she becomes a mother is the Malian woman recognized by her society—"through marriage she will find the contentment of her material and sexual needs, some emancipation, the possibility of becoming an adult, the confirmation of her status as a woman and of course, the promise of many children."[25] Thus, men and women still tend to view high fertility as the goal of marriage and as a measure of its success.

We agree with Odile Frank and Geoffrey McNicoll in their assessment that there are some countries in which women still gain access to economic security through their children, although it is more doubtful that the husbands themselves derive the nearly cost-free economic or social benefits that would lead them to want many children.[26] The area of "decision-making" on the number of children is a no-man's-land that is generally defined by culture. Little communication takes place between spouses, and it may well be that each spouse believes the other wants more children but that neither bothers to verify that assumption. According to the 1987 Mali DHS, among the currently married men surveyed in Bamako who knew about contraception, 44 percent said they had discussed it with their wife at least once in the year preceding the survey.[27] While interest in the topic is growing in Mali, that interest probably lies more in birthspacing than in family limitation. By any account, few real decisions are ever made in this area.

Most Malian women do not challenge their place in society or their dependence on a husband, nor do they consider that it might be within their power to change the system or to leave it. Their reproductive life appears to be largely regulated by the fatalistic belief that whatever happens is unavoidable. The interviewees invoked Allah as an incarnation of fate, not as a power imposing particularly large or small families but as an unpredictable force beyond human control. Although the drawbacks of a large family were occasionally acknowledged, they were not sufficiently negative to modify accepted behavior.

Birthspacing continues to be important culturally, but contraceptive use for limiting births is unacceptable unless a woman is in bad health or of exceptionally high parity. Most respondents want to space their children by three or four years, but not many succeed in doing so. Most women said that they do not want many children; five or six were the numbers most often quoted, although many of the older women gave a nonnumerical response ("up to God"). Although high-parity women stated a strong desire to "stop their births," many appeared to do little toward that end; instead, they hoped that God would help them.

John and Pat Caldwell have recently written two articles on the role of religion in regulating fertility behavior in Sub-Saharan Africa.[28] However, the cult of ancestors, which is so important in the Caldwells' accounts as a motivator of fertility, does not appear in our interviews. Furthermore, we do not see how the cult of the ancestors fits among the reasons given by women for not using contraceptives in the DHS survey for Mali, as only 6.5 percent of urban women who cited a reason invoked religion.[29]

There were indications of change in the demand for limiting births. Some women in our interviews had become skeptical of men's motives and viewed the large family as a burden:

> The men of today, they like many children because children are wealth; work, fatigue and exhaustion is for the woman.—*age 21, three births*

Female roles are currently being reshaped and educated women are increasingly speaking out: Many of the more educated women in our sample no longer wanted to share a husband with a co-wife; they wanted to have jobs in the modern sector, to use modern contraceptives and to have fewer children. These women no longer believe that a large family gives them status or that children come from God alone. They assume that the conditions of life are changing, and that four educated children are enough. However, even though improvements in education and in access to employment in the cash economy could hasten the social and economic development of Malian women, these improvements remain the privilege of a tiny minority.

References

1. A. Laplante, F. Samaké and G. F. Brown, *Family Planning in Mali*, International Development Research Center, Ottawa, Canada, 1975.

(Continued on page 99)

Costs and Benefits of Implementing Family Planning Services at a Private Mining Company in Peru

A cost-benefit analysis of family planning services offered by a mining company in Peru projected that the program would achieve a positive cash flow in its fourth year of operation, and would pay back its initial investment in the sixth year.

By Karen G. Foreit, Delia Haustein, Max Winterhalter and Ernesto La Mata

Summary

The wives of miners at a private mining company in Peru were found to have high fertility, low levels of contraceptive use and widespread interest in limiting childbearing. An analysis of potential costs and benefits of providing family planning services projected that the savings resulting from births averted would more than compensate for the costs of providing those services. Consequently, the company added maternal and child health and family planning services to its medical center, which had provided predominantly curative services. Within 18 months of program implementation, contraceptive prevalence among miners' wives had risen by 41 percent, and the percentage of women relying on modern methods had increased from 16 percent to 40 percent. The results of the program have convinced two other mines in the area to offer similar services.

Introduction

As public resources for primary health care services stagnate or decrease, developing countries are being forced to seek alternative sources for financing health care and family planning. A potentially significant but generally underutilized resource is the private commercial sector, especially those companies that already provide health and social benefits for employees and their dependents.[1]

Employer-subsidized family planning is not a new idea. In India, such programs date back to the 1950s, and the International Labour Office has been providing worldwide assistance to employer-based family planning initiatives since 1970.[2] Retrospective cost-benefit analyses have demonstrated the financial returns possible with large-scale family planning programs: The Mexican social security system showed a benefits-to-cost ratio of 9:1 for family planning services provided during the period 1972–1985 (using the present discounted value methodology to account for the time value of money).[3] However, the retrospective methodology is of limited value to employers considering whether to begin supporting family planning.

The Technical Information on Population for the Private Sector (TIPPS) Project, funded by the U.S. Agency for International Development, was designed to assist private, for-profit companies in deciding whether to invest in family planning services by analyzing the costs and benefits of such services for the company.[4] This article presents the results of a prospective cost-benefit analysis that was performed at a private mining company in Peru to help management determine whether to add integrated maternal and child health and family planning services to their existing medical plan. It also reports on the costs and the impact of the first two years of providing family planning services in the workplace.

Country Setting

Since the restoration of civilian rule in 1980, the policy environment in Peru has become increasingly favorable toward family planning. In 1980, the government created the National Population Council to formulate and implement population policy guidelines. In 1985, the National Population Law, which guarantees couples the right to determine the number and spacing of their children, and explicitly recognizes all voluntary contraceptive methods except sterilization, was passed. In 1987, a Presidential Population Commission was formed; shortly thereafter, the Commission formed the National Population Program 1987–1990, which called for a reduction in the total fertility rate (TFR) from 4.3 lifetime births per woman in 1985 to 2.5 lifetime births per woman in 2000. The National Family Planning Program was created within the Ministry of Health and was made responsible for coordinating public and private sector efforts.

Temporary contraceptive methods are available from public and private outlets, including the Ministry of Health and Social Security, voluntary organizations and commercial providers such as pharmacies and physicians. Voluntary sterilization is available only to those women at high reproductive health risk. The 1986 Demographic and Health Survey reported that 46 percent of women in union who were aged 15–44 were practicing contraception, with about half of them using traditional methods.[5] Pronounced regional differences were found, with contraceptive prevalence in metropolitan Lima estimated at 63 percent, and in the Sierra (the interior highlands) at 31 percent.

The mining industry in Peru employs approximately five percent of the country's formal labor force and produces nearly 50 percent of the country's traditional exports. Most mines provide curative health care and other benefits to employees and dependents. They seldom offer preventive health services or family planning, and are usually located in isolated rural areas in the Sierra, far from other health outlets that might provide such services.

Milpo mine is located northeast of the capital city of Lima. The mining community's resident population includes approximately 800 workers and 4,000 dependents, plus others who moved into the area to escape terrorists. Government regulations and collective bargaining contracts require the company to pay for a substantial number of fam-

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Table 1. Baseline fertility and ideal family size data among wives of miners, by woman's age, Peru, 1985

Type of data	Woman's age					
	20–24	25–29	30–34	35–39	40–44	45–49
Age-specific fertility rate	.360	.338	.305	.193	.133	.013
Mean no. of children ever born	2.6-	4.4	5.2	7.5	8.5	9.4
Mean no. of surviving children	2.0	3.8	4.5	6.0	6.4	6.9
Mean ideal family size	2.5	2.5	2.6	2.7	2.8	3.7

ily-related benefits, including salary supplements for wives and dependent children and free housing for workers and their families. Electricity, water and sewage services are provided free of charge and without limit; each family also receives a monthly ration of kerosene for cooking.

The company has invested approximately U.S. $10 million in housing and social welfare and medical services (with housing representing 83 percent of the total). It maintains a hospital and outpatient clinic for the workers' families. (The workers themselves are covered by national social security, and their medical services are provided in social security outlets.) The employer also maintains a preschool and provides a full primary and secondary education. Students are entitled to one free uniform per year, plus pens and notebooks; the school also furnishes a daily snack to all students. All these medical and educational expenses are assumed directly by the company.

Nevertheless, company officials were aware that workers' families had high levels of morbidity and required continual medical attention. In addition, high birthrates were straining available housing and were increasing company outlays for domestically consumed electricity and water.

The TIPPS Project was interested in the mining sector because of its national strategic importance and its potential to realize significant savings from family planning services. Project officials approached the directors of the mining company to conduct a prospective cost-benefit study of family planning and child survival services.

Methodology

As part of the project, baseline fertility among miners' wives and the costs associated with maternity were assessed in 1986. Data sources included company financial records, family registers and a household survey that was conducted during July 1986 and consisted of a random sample of 220 miners' wives aged 15–49. Mothers were asked about their recent fertility, their knowledge and use of contraceptives and their interest in receiving family planning services from the company clinic.

Potential costs and benefits of family planning service provision were projected in a sequential fashion, beginning with an analysis of base-period fertility and contraceptive use. Using women's expressed reproductive intentions and interest in accepting family planning, age-specific targets were established for contraceptive prevalence and method mix. Births averted by the improvement in contraceptive use were calculated along the principles of the births averted[6] and proximate determinants of fertility[7] techniques.

Using the TIPPS cost-benefit model,[8] we entered the number of women in union, the number of births and of contraceptive users in the baseline year and the target level of contraceptive prevalence and the target method-mix. The model provides default values for method-specific continuation rates and use-effectiveness, as well as for outpatient visits generated and commodities consumed by different kinds of family planning clients.

To complete the analysis, we used information from the company's financial records to enter annual fixed costs and variable (unit) costs, plus costs forgone per birth averted (program benefits). We obtained unit costs by prorating the costs of housing, water, electricity, medical care, schooling and other services by child's age. Costs forgone include the value of medical care, housing, schooling and other benefits provided to dependents. These vary by child's age: For example, maternity costs averted are entered in the year that the birth was averted, child health costs in the following 18 years and education costs beginning in the sixth year after the averted birth. Thus, total savings in any given year include those arising from births averted both in that year and in previous years.

Like benefits, program costs are entered on a yearly basis. Capital and start-up expenditures (such as training) are typically entered during the first year. Recurring expenditures, both fixed (e.g., salaries) and variable (e.g., supplies), are entered annually. Since yearly expenditures are calculated, the program manager can study both annual cash flows and the time needed to recoup the initial investment. If capital investments are a major cost component, the projection period can be lengthened to approximate the useful life expectancy of the assets.* In addition, the model computes a benefits-to-cost ratio with present discounted values of total program expenditures and savings, and the internal rate of return on the family planning investment.

Because the study demonstrated the need for and the financial benefits of providing family planning at the mine site, management added an integrated package of maternal and child health and family planning services to existing company-provided medical care in 1988; an evaluation of these integrated services was conducted in 1989. The evaluation was based on routine service statistics, a camp-wide census conducted by the program medical director in July 1989, and a follow-up clinical study of 305 outpatient visits conducted in November 1989.

Baseline Conditions

Birthrates for 1985 were calculated from family registers for the entire population. As shown in Table 1, age-specific fertility rates were high and did not decline until age 35. Women aged 45–49 had had more than nine births, with about seven of these children surviving. The TFR was 6.7 lifetime births per woman (not shown).

Contraceptive prevalence was consistent with observed fertility: Only 34 percent of the wives surveyed reported having used a family planning method in the past 30 days. Traditional methods, primarily rhythm, were used by 18 percent of the women in the sample, while 16 percent reported using a modern method (the pill, injectables, the IUD or sterilization). These rates were similar to those reported for the region in the 1986 Peru Demographic and Health Survey,[9] with the exception that the miners' wives reported greater reliance on hormonal methods and virtually no use of barrier methods.

Declared ideal family size among women under 45 ranged from 2.5 to 2.8 children. However, given the low use of effective contraceptives, achieved fertility quickly surpassed ideal family size. As seen in Table 1, by the time the average miner's wife finishes her reproductive life, she will have had 3–4 more children than she considered ideal.

Most of the women surveyed (86 percent) wanted no more children, and half of the remainder wished to delay their next birth by at least two years. Nevertheless, 62 percent of the former group and 81 percent of the latter were using no method of family planning. Over two-thirds of the women interviewed indicated that they would be interested in receiving contraceptives from the company clinic. Although most of the potential users wished to terminate childbearing, women currently using family planning were somewhat more interested than women who were not currently using (79 percent vs. 67 percent).

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*It would also be possible to use accounting costs, which would include capital utilization of the program rather than the current year's expenditures on capital. However, this procedure would not permit a cash-flow analysis, and is ultimately obviated by including the entire operating period and benefit horizon in the benefits-to-costs ratio and the internal rate of return.

Table 2. Projected annual and cumulative costs and benefits of family planning services provided to miners' wives (nondiscounted and expressed in constant U.S. dollars), and difference between benefit and cost, for first five years of program operation and for year 23*

Year	Annual			Cumulative		
	Costs	Benefits	Difference	Costs	Benefits	Difference
1	$11,562	$0	–$11,562	$11,562	$0	–$11,562
2	7,197	740	–6,457	18,759	740	–18,019
3	7,048	4,579	–2,469	25,807	5,319	–20,488
4	8,724	11,232	2,508	34,531	16,551	–17,980
5	7,623	20,359	12,376	42,154	36,910	–5,244
23	na	na	na	42,154	797,362	755,208

*Year 23 is presented to show the cumulative results of outlays averted over the 18 years following the births averted in years 1–5.

Program Projections

Given the existing unmet need for family planning and the wives' declared interest in receiving family planning from the company clinic, we estimated that within five years, a family planning program could raise contraceptive prevalence from 34 percent to 75 percent and increase the effectiveness of the method-mix, both by reducing the use of traditional methods (from 18 percent to six percent) and by increasing reliance on hormonal methods (from 12 percent to 39 percent) and on the IUD (from one percent to 25 percent). Achieving these targets would reduce the number of expected births by 80 percent in the sixth year after program launch, assuming that all other factors (lactation and induced abortion) remained constant.

The results of the baseline survey had also demonstrated a pressing need for child survival services such as vaccination, growth monitoring and appropriate treatment of diarrheal and acute respiratory infection. Therefore, we recommended that family planning services be added in the context of an integrated maternal and child health and family planning module. The marginal costs of adding this module to the existing medical service were calculated and prorated between the family planning and child survival components.[10]

The existing clinic facility was large enough to house the new services, and equipment needs were minimal. Thus, program costs consisted basically of salaries and benefits for two additional staff members, training and supervision, and contraceptive commodities and supplies. Since the population lives at the mine site, there were no transportation or promotion costs.

Table 2 presents the results of the cost-benefit projection for the first five years of program operation. The cost of family planning services was estimated at approximately U.S. $11,500 in the first year and at between U.S. $7,000–$8,700 in each of the next four years. Births are considered to be averted in the second year following family planning acceptance, and births continue to be averted for as long as the women used their methods. Benefits from births averted begin in the year after the birth was averted and continue to accrue for the next 18 years. The total value of savings, in terms of salary supplements, medical care, welfare, education and housing, was estimated at U.S. $4,300 (nondiscounted value) per birth averted.

For simplicity, Table 2 shows annual costs and benefits only for the first five years, the years in which the costs were incurred. The family planning program component was projected to achieve a positive cash flow in its fourth year of operation, as indicated by the positive value of the difference between annual costs and benefits (line 4, column 3). It would pay back its initial investment in the sixth year (not shown). The last line of the table corresponds to year 23 of the projection (18 years following the end of the five- year period of study), and summarizes the value of benefits accruing after the fifth year. The benefits-to-costs ratio and the internal rate of return are calculated on these total costs and benefits. Assuming an annual discount rate of 10 percent for dollar investments, the first five years of program operations would net a benefits-to-cost ratio of 7.4:1 (present discounted value), and an internal rate of return of more than 50 percent.

Implementation and Impact

On the basis of the projections, the company's board of directors decided to implement integrated maternal and child health and family planning services at the company clinic. An additional physician and nurse were hired, and two private institutions were contracted for training and on-site supervision.

Before starting the new services, the training and supervision consultants conducted an on-site needs assessment and met with management, human services staff and labor union leaders to explain the services. To increase the program's acceptability, a staggered implementation strategy was developed. The program began with well-baby care and maternal health services in May 1988,* in coordination with a national vaccination campaign conducted by the Ministry of Health. The family planning component began two months later, starting with the promotion of Pap smears to help prevent uterine cancer.

Program planning and implementation were the responsibility of the program physician and nurse.† All medical staff collaborated, and most of the family planning activities (especially IUD insertions) were carried out by clinic midwives. Promotional activities focused on interpersonal communication, including house-to-house visits by nurses to vaccinate, weigh and measure children, as well as group talks and individual orientation. Mothers seeking care for their children were also routinely counseled on family planning. Given the age of the population and the high proportion who wished to terminate childbearing, use of the IUD was encouraged. Few voluntary sterilizations were performed, due in part to Ministry of Health restrictions and in part to management's reluctance to perform voluntary surgery in the company hospital for fear of complications and potential problems with the labor union.

Early cancer detection received high priority. During 1989, 46 percent of miners' wives of reproductive age received a Pap smear; at baseline, only 11 percent had ever had one. Contraceptive services proved to be extremely popular, especially among younger women with some previous family planning experience. During the first 18 months of the program, total contraceptive prevalence among women of reproductive

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*The program was not fully operating until 1989. The first year was hampered by a series of unexpected and unavoidable events, including local and national labor strikes that closed the mine for 104 days during 1988.

†Community participation might have further enhanced program acceptability. However, management policies limit contact with union and community leaders to strictly contractual issues because of the sensitivity of labor relations in the mining industry, which has experienced strikes and other unrest.

Table 3. Baseline, projected and actual percentages of married women using contraceptives, by method, according to time period

Time	Total	Traditional	Modern		
			All	IUD	Other
Baseline	34	18	16	1	15
Projected					
12-month target	42	18	24	4	20
24-month target	51	17	34	8	26
Actual					
18-month prevalence	48	9	40	31	9

age rose by 41 percent over the baseline levels (Table 3), and use of modern methods more than doubled. These achievements compare very favorably with the targets developed for the family planning program. In 18 months, total contraceptive prevalence had almost reached the level projected for 24 months, and the method-mix that was achieved was much more effective than the target method-mix.

Fertility rates did not decline during the first year of the program. TFRs calculated from the 1989 camp-wide census were virtually identical to those at baseline (6.6 vs. 6.7 lifetime births per married woman). This was expected, however, since a pregnancy lasts nine months, and family planning cannot begin to avert births until at least that long after the acceptance of the method. It appeared likely that fertility declines would begin in the second year, since despite increased coverage for pregnant women, the percentage of all clinic visits among women of reproductive age that were devoted to prenatal care declined from 11 percent at baseline to six percent at the end of 1989.

Associated Costs

The costs of offering the new services were primarily the salaries and benefits paid to the additional personnel and their training and supervision. Milpo contracted for four weeks of theoretical and clinical training in child survival and reproductive health and family planning from two Lima-based private voluntary organizations specializing in these areas. In addition, the mine paid for quarterly supervision by two physicians, one from each training organization, consisting of three-day site visits followed by meetings with management in Lima.

Commodities were purchased by the company—hormonal contraceptives from pharmaceutical laboratories and IUDs from local family planning organizations. Laboratory services (for Pap smears) were purchased from private voluntary organizations at a price higher than cost, but lower than commercial rates. Small amounts of equipment (e.g., uterine elevators) were also purchased.

Program staff divided their time about equally between child health and reproductive health and family planning. Therefore, half of their salaries and benefits were assigned to family planning. Table 4 presents actual expenditures in U.S. dollars compared with the original cost projections. As shown, first-year costs were lower than projected, and second-year costs were higher. Salaries and benefits more than doubled from Year 1 to Year 2 as a result of Peru's hyperinflation, which outstripped the devaluation of the local currency. Training and supervision costs were higher in Year 2 than originally projected because of the company's decision to continue on-site supervision for a second year. Equipment and commodity expenditures were lower than projected.

Discussion

Milpo was among the first prospective cost-benefit studies conducted under the TIPPS Project, and the first service delivery program to be evaluated. Although an unmet need for family planning was clearly demonstrated at baseline, it was not certain that the population would accept modern family planning methods or that the prevalence targets upon which the cost-benefit analysis was predicated could be achieved.

Promotion of family planning encountered little resistance among women or their husbands, despite expectations that machismo and traditional attitudes towards fertility regulation might hamper program progress. Rumors about the negative health consequences of modern contraceptive methods (cancer, birth defects and psychological problems, among others) were prevalent throughout the population. Focus group interviews revealed that IUD users and nonusers of contraceptive methods shared the same health fears. This suggests either that negative attitudes are not a significant barrier to using family planning or that women feared another pregnancy more than they feared using family planning, a finding that has been reported elsewhere in Peru.[11]

Table 4. Projected and actual costs of family planning services, by year and by service component (in U.S. dollars)

Year and item	Projected	Actual
Year 1	**$10,062**	**$5,981**
Salary & benefits	4,500	2,844
Training & supervision	2,500	2,587
Equipment & materials	3,062	550
Year 2	**6,697**	**9,454**
Salary & benefits	4,500	6,674
Training & supervision	250	1,995
Equipment & materials	1,947	785

The significance of the Milpo experience has been recognized by both the public and private sectors. In 1989, Milpo accounted for 11 percent of all IUD insertions in its health region. This is striking in light of Milpo's small size relative to the rest of the region—fewer than 1,000 women out of an estimated 65,000 women of reproductive age. The accomplishment led the regional administrative coordinator for the Child Survival Program to report that "the percentage increase in IUDs [in Pasco department] is due to the collaboration of personnel from the private mining sector with [Ministry of] Health personnel."[12] In addition, the program medical director was asked to join the departmental coordinating committee for the National Family Planning Program.

Milpo has made maternal and child health and family planning services a permanent part of its benefits package, even though it was not required to do so under its union agreement, and has contracted for a second year of quarterly on-site supervision. The company president has actively promoted the concept among the other mines in the area. In November 1989, two other private mines initiated integrated services and contracted for training and supervision of their medical staff. Other mines have indicated interest in beginning similar programs when the economy improves.

The Milpo experience is important for several reasons. It was the first company in the TIPPS Project to decide to provide family planning on the basis of a prospective cost-benefit analysis. Aside from the analysis and the follow-up survey, Milpo received no government or donor subsidies: All program costs have been borne by the company. Moreover, as an industry leader, Milpo convinced two other companies to follow its example without conducting further cost-benefit analyses, which demonstrates the multiplier effect of the original study.

Financial considerations may not be necessary or sufficient to convince a given company to begin to underwrite family planning, but they are critical in sustaining a program over a long term. For example, one literature review found that relatively few of the companies that had received donor subsidies to offer family planning had "graduated" to supporting the programs with their own funds, and that many of these had continued to receive commodity support from government or nongovernmental organizations.[13] A review of the Enterprise Project was more positive, listing 17 subprojects that had begun to sustain family planning after subsidies ended and only two that had not. Employers' contributions had ranged from 12 percent to 164 percent of donor subsidies; the median contribution among the sustainable group had been 49 percent of the donor subsidy, and the mean was 66 percent (standard deviation of 55).[14]

Few employers can afford to sustain economic losses, even for the most socially desirable outcomes. Depending on what benefits these employers provide, not all will be able to underwrite family planning without outside support. If governments and donors are serious about enlisting the private sector in developing countries to provide family planning, they must pay serious attention to the bottom line. Efforts should begin with those employers who already pay substantial maternity-related benefits and therefore have the potential to realize significant savings through family planning. The Milpo experience meets these criteria and demonstrates how even a relatively small work site can have a major regional impact.

References

1. M. Lewis and G. Kenney, "The Private Sector and Family Planning in Developing Countries," Policy, Planning and Research Working Paper, No. 96, World Bank, Washington, D.C., 1988; and D. Logan, M. Friedman and M. Lown, "Mobilizing the Resources of the For-Profit Sector to Support the Expansion of Family Planning Services in the Developing World," Population Technical Assistance Project, Occasional Paper No. 3, Dual and Associates, Inc., Arlington, Va., 1989.

2. W. Rinehart, R. Blackburn and S. H. Moore, "Employment-Based Family Planning Programs," *Population Reports*, Series J, No. 34, 1987.

3. D. Nortman, J. Halvas and A. Rabago, "A Cost-Benefit Analysis of the Mexican Social Security Administration's Family Planning Program," *Studies in Family Planning*, **17**:1, 1986.

4. K. G. Foreit and J. Novak, "Stimulating the Commercial Sector to Invest in Family Planning Through Cost-Benefit Projections," paper presented at the annual meeting of the Population Association of America, New Orleans, La., 1988.

5. Instituto Nacional de Estadística (INE), *Encuesta Demográfica y de Salud Familiar: Informe General*, Lima, Peru, 1988.

6. D. Nortman et al., *Birth Rates and Birth Control Practices*, The Population Council, New York, 1978.

7. J. Bongaarts and R. G. Potter, *Fertility, Biology, and Behavior: Analysis of the Proximate Determinants*, Academic Press, New York, 1983.

8. K. G. Foreit and J. Bennett, *The TIPPS Model for Projecting Costs and Benefits of Family Planning Services Delivery: A User's Manual*, John Short & Associates, Columbia, Md., 1989.

9. INE, 1988, op. cit. (see reference 5).

10. K. G. Foreit et al., "Costs and Benefits of Implementing Child Survival Services at a Private Mining Company in Peru," *American Journal of Public Health*, **81**:1055, 1991.

11. A. L. Fort, "Investigating the Social Context of Fertility and Family Planning: A Qualitative Study in Peru," *International Family Planning Perspectives*, **15**:88, 1989.

12. U.S. Agency for International Development, regional administrative coordinators' quarterly reports, Child Survival Action Project, Lima, Peru, Oct.-Dec. 1989.

13. W. Rinehart, R. Blackburn and S. H. Moore, 1987, op. cit. (see reference 2).

14. J. P. Skibiak, "Employment-Based Family Planning in the Private Sector: Lesson of Enterprise," draft report, John Snow, Inc., Arlington, Va., 1991.

Resumen

Las esposas de los mineros de una empresa privada del Perú evidenciaron una alta fecundidad, bajos niveles de uso de anticonceptivos y un interés generalizado por tener menos hijos. Según un análisis de los costos y beneficios potenciales que entrañaría la prestación de servicios de planificación familiar, la economía resultante de los embarazos evitados compensaría con creces el coste de los servicios. En consecuencia, la empresa instituyó servicios de salud materno-infantil y planificación familiar en su centro médico, que prestaba hasta entonces atención fundamentalmente terapéutica. A los 18 meses de aplicación del programa, la prevalencia de anticonceptivos entre las esposas de los mineros había aumentado en un 41 por ciento, mientras que la cantidad de mujeres que empleaban métodos modernos pasaba del 16 al 40 por ciento. Los resultados del programa han inducido a dos otras minas de la región a ofrecer servicios similares.

Résumé

Une étude menée sur les épouses des ouvriers d'une exploitation minière privée au Pérou a révélé parmi elles un taux de fécondité élevé, une faible prévalence contraceptive et un intérêt répandu à la limitation des grossesses. L'analyse des coûts et avantages potentiels de la prestation de services de planification familiale ayant indiqué que les économies réalisées grâce à la limitation des naissances feraient probablement plus que compenser les coûts de ces services euxmêmes, la société minière décida d'agrémenter son centre médical—qui s'était jusque-là essentiellement limité aux soins curatifs—d'un programme de santé maternelle et infantile et de services de planification familiale. Moins de 18 mois après la mise en oeuvre du programme, la prévalence contraceptive parmi les épouses des mineurs avait augmenté de 41 pour cent et le pourcentage des femmes ayant recours aux méthodes modernes était passé de 16 à 40 pour cent. Les résultats du programme ont convaincu deux autres exploitations minières de la région d'offrir à leur main-d'oeuvre des services similaires.

Corrections

In the review of *The Causes of Demographic Change: Experimental Research in South India* [**17**:38, 1991], a book by John C. Caldwell, P. H. Reddy and Pat Caldwell, the statement is made that the primary research responsibilities "were shouldered by non-Indians and Indian students and researchers acted as assistants." However, the principal investigator in charge of the field program was P. H. Reddy, director of the Population Centre, Bangalore, India. The project was based at the Centre, to which John C. Caldwell and Pat Caldwell were temporarily attached. Coresearchers were the professional staff of the Centre and not students.

The boldface caption at the beginning of "Contraceptive Failure Rates in Developing Countries: Evidence from the Demographic and Health Surveys" [**17**:44, 1991] contains an incorrect percentage. It should read "Overall failure rates—inclusive of sterilization—vary substantially across countries, ranging from low values of two percent in Thailand and three percent in Indonesia to high values of 16 percent in Peru and almost 20 percent in Bolivia."

Use-Effectiveness Among Users of the Symptothermal Method of Family Planning

"Although [the symptothermal method] is less effective than methods such as the pill or the IUD, it may provide a satisfactory [alternative] for women who are concerned about the side effects of medical contraceptives."

By Robert T. Kambic, Ronald H. Gray, Richard St. Mart,
Claude A. Lanctot and Mary C. Martin

Summary

A 1987 retrospective study examined effectiveness and continuation rates for the symptothermal method (STM) of family planning among a group of 507 women in Mauritius who had completed a training period and were considered to be autonomous users. Women who had been using STM to space their births and those who had been using it to limit births were equally likely to have experienced an unplanned pregnancy after 24 months of use (12 per 100 women). An additional 40 women per 100 who were spacing births reported a planned pregnancy, compared with six per 100 who said they were using STM to limit births. Continuation rates after two years were 51 per 100 for spacers and 80 per 100 limiters. Women who had discontinued use to become pregnant were more likely to resume use than were those who had an accidental pregnancy or who discontinued use for other reasons.

Introduction

Mauritius is a small island nation in the Indian Ocean with a population of approximately one million. In the 1960s, concern over population growth led to the development of a national family planning program in which promoting the use of natural family planning (NFP) was a major part. Action Familiale, the official NFP provider agency in Mauritius, was established in 1963. The agency teaches only the symptothermal method (STM), which involves monitoring changes in both cervical mucus and basal body temperature.[1] The 1985 Mauritius contraceptive prevalence survey found that 86 percent of reproductive-age women had ever used and 75 percent were currently using contraceptives. It also found that 34 percent of reproductive-age women had ever used and 17 percent were currently using either STM or the calendar rhythm method.[2]

Action Familiale clients can be divided into learners and autonomous users. A client learning STM is taught to recognize, chart and interpret signs of the various stages of the menstrual cycle; an autonomous user no longer needs such instruction. The concept of autonomy was developed in the Mauritius program in the 1960s,[3] and is now used as a client management tool by NFP programs around the world.

Although there are different definitions of STM autonomy, all use the following criteria for designating a client as autonomous: The client must be able to correctly chart daily fertility indicators; understand the fertile and infertile days of the cycle and be able to recognize a change in fertility patterns and to seek help when needed; be able, with her partner, to adjust sexual behavior to coincide with family planning intention; and feel satisfied with the method.[4] Some NFP programs may delay designating a client an autonomous user to provide additional education beyond NFP, and some autonomous users may need further support from time to time.[5]

According to estimates derived from Action Familiale service statistics, over 30,000 Mauritian women had been taught STM by 1985, and the cumulative number of women classified as autonomous users was around 13,000.[6] Client autonomy is an important goal for NFP programs. An autonomous user does not need resources for instructional follow-up or chart review, both of which consume time and money. Moreover, if autonomous users continue NFP over an extended period, the initial high cost of the method, primarily due to instructors' time, is distributed over many years, thus reducing the overall cost per couple-year of protection.[7]

This retrospective study assesses efficacy among autonomous STM users and characterizes discontinuing autonomous clients so that they can be targeted for intervention and support. It was conducted by Action Familiale, in collaboration with The Johns Hopkins University School of Hygiene and Public Health and The International Federation for Family Life Promotion.

Methods

The study sample was selected from among 2,308 Mauritian women in 16 Action Familiale service areas who had become autonomous users in 1984–1985. Married women aged 19–35 who had had at least one pregnancy were stratified by service area and year. Within each cell, 20 percent of the women were chosen at random. Of 536 women selected, 89 had moved and could not be traced, one had died and one was no

Table 1. Characteristics of autonomous users of the symptothermal method, by birth intention, Mauritius, 1984–1985

Characteristic	All	Spacers (N=242)	Limiters (N=265)
Respondents' mean age	26.8	25.2	28.4*
Husbands' mean age	32.4	30.6	34.0*
Mean years married	6.0	3.9	7.9*
Mean live births	2.0	1.3	2.6*
% Catholic	37.1	36.8	37.4
% Hindu	47.3	49.6	45.3
% Muslim	12.8	12.8	12.8
% housewives	62.1	64.0	60.4
% with ≥ secondary education	56.4	66.5	47.2*
% husbands with remunerative work	84.6	86.8	82.6

*p<.001.

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Table 2. Cumulative continuation rates (and standard errors) per 100 autonomous users of the symptothermal method; and discontinuation rates, by reason for discontinuing; according to birth intentions and time period

Intention and time period	N	Continuers	Discontinuers		
			Personal	Accidental pregnancy	Planning a pregnancy
Spacers					
12 months	186	73.5 (2.8)	1.0 (0.7)	7.3 (1.8)	20.5 (3.1)
24 months	99	51.0 (3.3)	4.6 (1.8)	11.6 (2.6)	39.9 (4.9)
Limiters					
12 months	240	89.8 (1.9)	0.8 (0.6)	6.2 (1.6)	3.5 (1.2)
24 months	167	79.5 (2.6)	4.5 (1.4)	11.7 (2.3)	5.7 (1.6)

longer married. These 91 women were replaced by the next client in the sample cell. All of the women agreed to participate and were visited by trained interviewers between May 9 and August 12, 1987.

The women were questioned about their use of STM from the time they were classified as autonomous users to the time of the interview. They were asked about their intention to space or limit births and about their breastfeeding status at the point that they completed the training period or after any ensuing pregnancies. Women fully breastfeeding were not considered to be exposed to the risk of pregnancy and were not entered into the analysis* until they started supplementation.

Women who discontinued use of STM were asked the date and the reason they did so. The possible reasons for discontinuation were: having no need for family planning, wanting to become pregnant, having an accidental pregnancy or other reasons. Discontinuers were also asked if they had subsequently resumed use of NFP, adopted other contraceptive methods or used no method.

Our analyses looked only at the interval of use between the beginning of autonomy and either discontinuation or the interview. Some clients returned to STM after a discontinuation of autonomous use, but only first intervals of use were considered in the analysis. Life-table methods were used to estimate continuation and discontinuation rates for autonomous use. Clients were stratified by family planning intention at the start of autonomous use into women who wished to space births (spacers) and women who wanted no further births (limiters). The rates of discontinuation for personal reasons, for unplanned pregnancy and for women planning a pregnancy were compared by single-decrement rates.†

Results

Of the 536 women who were interviewed, seven were excluded because they said they had discontinued STM use prior to autonomy. Among the remaining 529 women, 507 wanted to avoid pregnancy and 22 were using the method for other reasons. The 507 women trying to prevent pregnancy were the study population.

Table 1 presents characteristics of these respondents at the time they were classified as autonomous in 1984–1985. The sample was almost evenly divided into spacers (N=242) and limiters (N=265). On average, limiters were significantly older than spacers (age 28 vs. age 25), had been married longer (eight years vs. four years) and had had more live births (2.6 vs. 1.3). Limiters were also less educated: Forty-seven percent had a secondary education or higher, compared with 67 percent of spacers. There were, however, no significant differences between spacers and limiters in religion or employment, and for both groups, the median STM learning time had been 12 months (not shown).

Sixty-three percent of the women used STM during the entire interval between the beginning of autonomous use and the interview. Table 2 shows life-table single-decrement rates of continuation and discontinuation. The two-year continuation rates for women spacing births (51 per 100 women) were significantly lower than for women wishing to limit fertility (80 per 100 women). Among spacers, wanting to become pregnant was the primary reason for having discontinued use (40 per 100 women at 24 months), while having an unplanned pregnancy was the most common reason among limiters (12 per 100 women). Limiters were no more likely than spacers to have discontinued use because of an unplanned pregnancy at either 12 months or 24 months of autonomous STM use. Not surprisingly, however, spacers were far more likely than limiters to have discontinued at 12 months (21 vs. four per 100 women—p<.001) and at 24 months (40 vs. six per 100 women—p<.001) because they wanted to become pregnant.

Of the 186 women who had discontinued use at some point, 17 percent were pregnant at interview, 42 percent had resumed autonomous STM use, 24 percent had adopted another method of family planning and 17 percent were using no method.‡ Some of the women using no method were probably in need of family planning. Among the women who had discontinued use to become pregnant, 55 percent resumed STM use after their pregnancy, a proportion significantly higher (p<.01) than the 28 percent of women who began using STM again after an accidental pregnancy.

Using maximum likelihood procedures,[8] we estimate that the mean duration of autonomous use over the period was 2.2 years. Couple-years of protection for the cohort was estimated by multiplying mean duration of use by the number of autonomous users in the total cohort.[9] Of the 2,308 women in the 1984–1985 cohort of autonomous users in Mauritius, we estimate that 95 percent (2,183) began autonomy with the intention of avoiding pregnancy. After three years they would have accumulated 4,803 couple-years of protection.

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*Six women were fully breastfeeding when they graduated to autonomy. They breastfed for an average of 3.2 months before introducing supplements. They were entered into the life-table analysis at the introduction of supplements. Twenty-three women were partially breastfeeding when they graduated to autonomy. These women were entered into the analysis at autonomy. The contraceptive prevalence survey points out that breastfeeding is not intensive in Mauritius and "thus breastfeeding provides relatively little protection against conception in Mauritius" (see: Mauritius Ministry of Health, 1987, reference 2).

†Multiple-decrement life-table rates allow a subject to discontinue for a variety of reasons. The rates sum to the total discontinuation rate and can be compared within strata. Single-decrement rates allow a subject to discontinue for only one reason. All other reasons for discontinuation are treated as withdrawals. Single-decrement rates are used to compare discontinuation between separate groups or strata. These latter rates are higher than multiple-decrement rates, and single-decrement rates cannot be summed within a group to equal the discontinuation rate. There is differing terminology for multiple- and single-decrement life-table rates. Some earlier authors called multiple-decrement rates "net rates" and single-decrement rates "gross rates" (see: C. Tietze and S. Lewit, "Statistical Evaluation of Contraceptive Methods: Use-Effectiveness and Extended Use Effectiveness," *Demography* 5:931, 1968; and J. Sinquefield, *Single and Multiple Decrement Life Table Procedures for the Analysis of the Use Effectiveness of Contraception*, Community and Family Study Center, University of Chicago, 1973). More recent authors (see: S. P. Azen et al., "Some Suggested Improvements to Current Statistical Methods of Analyzing Contraceptive Efficacy," *Journal of Chronic Disease*, 29:649, 1976; and T. M. M. Farley, "Life Table Methods for Contraceptive Research," *Statistics in Medicine*, 5:475, 1986) call multiple-decrement rates "crude rates" and single-decrement rates "net rates," following Chiang (see: C. L. Chiang, *Introduction to Stochastic Processes in Biostatistics*, Wiley & Sons, New York, 1968). For more discussion of this issue, see: reference 11.

‡There may be a few women who were unknowingly pregnant and were classified as continuing users. However, because STM users are aware of their fertile time and intercourse patterns, we believe the degree of any misclassification would be minimal.

Discussion

This study has shown high use-effectiveness among autonomous STM users wishing to space or limit their births: Only 12 per 100 women in each group experienced accidental pregnancy within 24 months of beginning autonomous use. Furthermore, women averaged about 2.2 years of continuous STM use over the three years examined in this study. These findings suggest that autonomous users can successfully avoid unwanted pregnancy for protracted periods of time. In addition, since autonomous couples make no continuing demands on the program, the long-term STM use implies no ongoing service delivery costs.

At least one study has reported similar results among autonomous users in the United States.[10] James Trussell and Kathryn Kost showed a wide variation in NFP 12-month unplanned pregnancy rates—from 12.6 up to 35.0 per 100 woman-years—but these rates included both learning and autonomous users of a variety of NFP methods.[11] The autonomous STM users in the current study are a select group of women who were well trained by the Action Familiale program and were highly motivated. Among such women, STM can clearly be used effectively and over a long period.

The median learning time of the clients in this study was 12 months, which is relatively long. In a 1981 World Health Organization study of 848 women learning NFP, 94 percent had an "interpretable ovulatory" pattern by the third cycle and 97 percent had a good or excellent understanding of NFP.[12] A six-year U.S. study ending in 1982 found a median learning time of eight months among a group of STM users.[13] The learning time in Mauritius may be longer because of more stringent requirements for autonomy.

The 31 STM dropouts who did not subsequently use other family planning methods represent a group that may benefit from further contact with Action Familiale. Most of them will need family planning and some may wish to return to STM.

We found that family planning intention was the main predictor of continuation: Women who expressed an intention to limit further pregnancies were more likely to continue use than women who used the method to space births (80 vs. 51 per 100 women at two years). Moreover, women who discontinued use to have a planned pregnancy subsequently resumed use more frequently than women who stopped because of an accidental pregnancy (55 percent vs. 28 percent). This suggests that a majority of women who stop for a planned pregnancy are satisfied with the method.

The 1985 Mauritius contraceptive prevalence survey (CPS) permits some comparison of this autonomous cohort with NFP users in the general population.[14] The CPS found that 17 percent of 3,020 women currently practicing contraception were using NFP, and that among NFP users, 24 percent were using STM and 63 percent the calendar method. While Action Familiale trained the majority of those using STM, only 36 percent of all NFP users had been Action Familiale clients. Although the CPS did not determine the use-effectiveness of the calendar rhythm method, reviews of the literature show that STM is generally more effective for preventing pregnancy than other NFP methods.[15]

The autonomous STM users in this study are better educated than the general population of women in Mauritius. Fifty-six percent of the study women had a secondary school education, compared with 24 percent of all women age 15–50. According to the CPS, women with more than a primary education were two times as likely to have ever used NFP as women with less than a primary education. It seems that STM appeals to the better-educated women in Mauritius, but it is not clear why. Further investigation is warranted.

Although STM is less effective than methods such as the pill or the IUD, it may provide a satisfactory option for women who are concerned about the side effects of medical contraceptives. One study has found that the choice of contraceptives is viewed by women as a balance of risks and benefits, and that the principal trade-off is between safety and effectiveness.[16] Another found that after a pregnancy, Malaysian women are more likely to return to the less-effective methods (rhythm, abstinence and withdrawal) than to the pill, because they are concerned about the side effects of the latter method.[17] Women in the Philippines point to medical safety and convenience as reasons for preferring rhythm to other methods.[18]

Thus, the long-term user of STM may feel that the side effects associated with other, more effective methods outweigh the higher risk of pregnancy they face with STM. Moreover, autonomous users develop accurate and detailed knowledge of their menstrual cycle, and successful use of this knowledge to plan and avoid pregnancy can provide a sense of control and ability to cope with life.[19] These additional benefits increase satisfaction with STM as a family planning method, and therefore may reduce method-switching.[20]

References

1. G. Conner and N. Veeder, *Action Familiale: Program Review and Evaluation*, Action Familiale, Rose Hill, Mauritius, 1981.

2. Mauritius Ministry of Health, *Mauritius Contraceptive Prevalence Survey, 1985*, final report, Evaluation Unit Family Planning/Maternal Health Division, Port Louis, Mauritius, 1987.

3. F. Guy and M. Guy, *Ile Maurice, Regulation des Naissances et Action Familiale*, Editions Xavier Mappus, Lyon, France, 1968.

4. R. T. Kambic and M. C. Martin, "Evaluating Client Autonomy in Natural Family Planning," *Advances in Contraception*, **4**:221, 1988.

5. C. A. Lanctot, "Development of Natural Family Planning in the 21st Century," paper presented at St. John's Medical College and Hospital International Conference on Welfare of Women and Fertility Awareness, Bangalore, India, Jan. 1990; and R. St. Mart, Action Familiale, personal communication, Mauritius, 1990.

6. Action Familiale, *Service Statistics*, Rose Hill, Mauritius, 1987.

7. R. T. Kambic and M. C. Martin, 1988, op. cit. (see reference 4); and J. E. Laing, "Natural Family Planning in the Philippines," *Studies in Family Planning*, **15**:49, 1984.

8. P. M. Kulkarni and R. G. Potter, "Extrapolation of IUD Continuation Curves," *Population Studies*, **30**:353, 1976.

9. S. M. Wishik and K. Chen, *Couple Year of Protection: A Measure of Family Planning Program Output*, International Institute for the Study of Human Reproduction, Columbia University, New York, 1973.

10. R. T. Kambic and M. C. Martin, 1988, op. cit. (see reference 4).

11. J. Trussell and K. Kost, "Contraceptive Failure in the United States: A Critical Review of the Literature," *Studies in Family Planning*, **18**:237, 1987.

12. World Health Organization, "A Prospective Multicentre Trial of the Ovulation Method of Natural Family Planning, I. The Teaching Phase," *Fertility and Sterility*, **36**:152, 1981.

13. R. T. Kambic and M. C. Martin, 1988, op. cit. (see reference 4).

14. Mauritius Ministry of Health, 1987, op. cit. (see reference 2).

15. R. H. Gray and R. T. Kambic, "Epidemiological Studies of Natural Family Planning," *Human Reproduction*, **3**:693, 1988.

16. D. Yankelovich, F. Skelly and A. White, "A Study of Women's Attitudes Towards Contraceptive Alternatives," unpublished study prepared for the Upjohn Company, Yankelovich, Skelly, and White Inc., New York, 1982.

17. J. DaVanzo et al., "Contraceptive Choice and Method Switching in Malaysia," *Fertility Determinants and Research Notes*, Vol. 20, The Population Council, 1987, pp. 4–5.

18. J. E. Laing, 1984, op. cit. (see reference 7); and ——, "Periodic Abstinence in the Philippines: New Findings from a National Survey" *Studies in Family Planning*, **33**:32, 1987.

19. A. Tolor, F. J. Rice and C. A. Lanctot, "Personality Patterns of Couples Practicing the Temperature-Rhythm

Method of Birth Control," *The Journal of Sex Research,* **11**:119, 1975; and J. Bardwick, "Psychological Aspects of Implementing Natural Family Planning Programs," published proceedings of the International Seminar on Natural Methods of Family Planning, Department of Health, Dublin, Ireland, with the World Health Organization, Cahill, Dublin, 1979, pp. 42–56.

20. G. Boys and R. Ediger, *Natural Family Planning Nationwide Survey: Final Report to the National Conference of Catholic Bishops Diocesan Development Program for Natural Family Planning,* Irvington, N.J., 1989.

Resumen

En 1987 se realizó un estudio retrospectivo de las tasas de eficacia y continuación del método sintotermal (MST) de planificación familiar entre 507 mujeres de Mauricio que habían completado el período de capacitación y se consideraban usuarias autónomas. Las que habían venido utilizando el MST para espaciar los hijos y las que lo habían usado para dejar de tenerlos resultaron igualmente propensas a haber tenido un embarazo no deseado al cabo de los 24 meses de practicar el método (12 por 100 según un análisis de tabla de vida). Cuarenta por 100 de las que procuraban espaciar los embarazos informaron de un embarazo planificado, contra seis por 100 de las que dijeron estar utilizando el MST para no tener más hijos. Las tasas de continuación después de los dos años eran del 51 por 100 para las que querían espaciar los hijos y del 80 por 100 para las que no deseaban tener más. Las mujeres que habían dejado de usar el método para quedar embarazadas eran más propensas a reanudarlo que aquellas que habían quedado accidentalmente embarazadas o dejado de emplearlo por otras razones.

Résumé

Une enquête rétrospective effectuée en 1987 s'est penchée sur la question des taux d'efficacité et de persévérance de la méthode symptothermique de la planification familiale parmi 507 Mauriciennes qui avaient été soumises à une période de formation complète et étaient considérées utilisatrices autonomes. Les femmes qui avaient eu recours à la méthode pour espacer ou pour arrêter les naissances présentaient un taux égal de probabilité de grossesse non planifiée après 24 mois d'usage (12 pour cent). Quarante pour cent des femmes utilisant la méthode pour espacer les grossesses ont signalé une grossesse planifiée, par rapport à six pour cent parmi celles qui voulaient n'en avoir plus. Les taux de persévérance après deux ans s'élevaient à 51 pour cent parmi les femmes qui voulaient espacer les grossesses et à 80 pour cent parmi celles désireuses de les arrêter. Les femmes qui avaient abandonné la méthode parce qu'elles désiraient devenir enceintes étaient plus susceptibles de la reprendre que celles qui avaient connu une grossesse accidentelle ou qui avaient abandonné la méthode pour d'autres motifs.

Family Planning in Bamako, . . .

(Continued from page 90)

2. A. Tounkara, *Analyse des données de service de l'Association Malienne pour la Protection et la Promotion de la Famille,* Association Malienne pour la Promotion et la Protection de la Famille (AMPPF), Bamako, and Family Health International, N.C., 1982.

3. A. Kader Boye et al., "La condition juridique et sociale de la femme dans quatre pays du Sahel," *Etudes et Travaux de l'Unité de Statistiques et d'Etudes Démographiques,* No. 9, Bamako, Mali, 1987.

4. Westinghouse Social Science International, *Population Policy Review: Mali Demographic Data for Development,* Columbia, Md., 1984.

5. A. Kader Boye et al., 1987, op. cit. (see reference 3).

6. A. Tounkara, 1982, op. cit. (see reference 2).

7. Ibid.

8. M. E. Dalmat, J. S. Friedman and N. N. Burton, *Evaluation des services de planning familial pour le Ministère de la Santé Publique et des Affaires Sociales du Mali,* mimeo, Bamako, Mali, 1981.

9. A. Kader Boye et al., 1987, op. cit. (see reference 3).

10. N. J. Binkin et al., "Women Hospitalized for Abortion Complications in Mali," *International Family Planning Perspectives,* **10**:8, 1984.

11. J. Henderson Lewis et al., *Breastfeeding, Contraception and Birth Spacing in Mali,* Division of Family Health, Ministry and Social Affairs, Bamako, Mali, 1983.

12. B. Traoré, M. Konaté and C. Stanton, *Enquête Démographique et de Santé au Mali,* Centre d'Etudes et de Recherches sur la Population pour le Développement, Bamako, Mali, and Institute for Resource Development/Westinghouse, Columbia, Md., 1989.

13. Department of International Economic and Social Affairs, Statistical Office, *Demographic Year Book 1986,* United Nations, New York, 1986.

14. D. Wulf, "The Future of Family Planning in Sub-Saharan Africa," *International Family Planning Perspectives,* **11**:1, 1985.

15. B. Traoré, M. Konaté and C. Stanton, 1989, op. cit. (see reference 12).

16. A. J. Henry, "L'âme d'un peuple africain: les Bambara, leur vie psychique, ethnique, sociale et religieuse," Munster, France, 1910.

17. E. van de Walle and F. van de Walle, "Breastfeeding and Popular Etiology in the Sahel," *Health Transition Review,* **1**:69, 1991.

18. B. Traoré, M. Konaté and C. Stanton, 1989, op. cit. (see reference 12).

19. Ibid.

20. J. C. Caldwell and P. Caldwell, "The Cultural Context of High Fertility in Sub-Saharan Africa," *Population and Development Review,* **13**:409, 1987.

21. F. van de Walle and B. Traoré, *Attitudes of Women and Men Towards Contraception in Bobo-Dioulasso,* African Demography Working Paper No. 13, Population Studies Center, University of Pennsylvania, Philadelphia, 1986.

22. J. Knodel and E. van de Walle, "Lessons from the Past: Policy Implications of Historical Fertility Studies," *Population and Development Review,* **52**:217, 1979.

23. C. F. Westoff, "Is the KAP-Gap Real?" *Population and Development Review,* **14**:225, 1988.

24. E. Boserup, "Economic and Demographic Interrelationships in Sub-Saharan Africa," *Population and Development Review,* **11**:383, 1985; O. Frank and G. McNicoll, "Fertility and Population Policy in Kenya," *Population and Development Review,* **13**:209, 1987; and E. R. Fapohunda and M. P. Todaro, "Family Structure and Demand for Children in Southern Nigeria," *Population and Development Review,* **14**:571, 1988.

25. D. Bazin-Tardieu, *Femmes du Mali,* Editions Lemeac, Ottawa, Canada, 1975.

26. O. Frank and G. McNicoll, 1987, op. cit. (see reference 24).

27. B. Traoré, M. Konaté and C. Stanton, 1989, op. cit. (see reference 12).

28. J. C. Caldwell and P. Caldwell, 1987, op. cit. (see reference 20); and ——, "Is the Asian Family Planning Program Model Suited to Africa?" *Studies in Family Planning,* **19**:19, 1988.

29. B. Traoré, M. Konaté and C. Stanton, 1989, op. cit. (see reference 12).

Resumen

Pese a que en Bamako, Malí, hay disponibilidad general de anticonceptivos modernos, la práctica de la planificación familiar se mantiene muy limitada. Una encuesta a fondo de 78 mujeres que habían dado recientemente a luz reveló un alto nivel de conocimiento de métodos unido a niveles reducidos de uso actual o anterior. Si bien las encuestadas con frecuencia se decían estar cansadas de tener hijos, tendían a considerar que una se casaba para tenerlos y que su cantidad permitía medir el éxito del matrimonio. Si bien es posible que la demanda de anticonceptivos a fines de espaciar los embarazos vaya en aumento, la de métodos para dejar de tener hijos parece casi inexistente.

Résumé

Malgré la disponibilité générale des méthodes modernes à Bamako, au Mali, la pratique contraceptive demeure très limitée. Des entrevues approfondies tenues avec 78 femmes qui avaient récemment donné naissance y ont révélé un haut niveau de connaissance des méthodes mais de faibles niveaux d'usage actuel ou passé. Bien que beaucoup de femmes dans l'échantillon aient exprimé leur lassitude de se trouver enceintes, elles avaient tendance à voir dans la maternité le but même du mariage, et à mesurer la réussite du leur dans le nombre d'enfants qu'elles avaient portés. Si la demande de méthodes à retarder les naissances apparaît en hausse, celle de méthodes à les arrêter semble virtuellement inexistante.

Social and Psychological Aspects of Tubal Ligation In Zaire: A Follow-Up Study of Acceptors

Only half of the Zairian acceptors had talked to others about their sterilization. To compensate for this lack of informal communication, future programs must be designed with a strong information-education-communication component.

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Summary

A 1987–1988 survey of 453 Zairian women who had had a tubal ligation found that, on average, the women were 37 years old and had seven living children at the time of the operation. Ninety-two percent were married, and of these, 95 percent had consulted with their husbands before undergoing the procedure. Only 40 percent of the women had spoken with another woman who had undergone tubal ligation before having the operation themselves, and less than 25 percent had discussed their operation with other family members or friends. The two main reasons for having had the operation were "health" and "had enough children." Most of the women said they had experienced no change at all or a change for the better in their health, ability to do physical labor and marital relations. However, 14 percent admitted having some regret over the operation; regret was associated with having five or fewer children, feeling pressured into the decision, and believing their husband had tried to have children with another woman. Although the women who had undergone the operation were generally positive about the sterilization, they were reluctant to discuss it openly with friends and neighbors.

Introduction

Voluntary surgical sterilization is currently the most widely practiced method of family planning in the world.[1] As permanent methods of contraception have grown in popularity, researchers have become increasingly interested in both their clinical and social aspects. As of 1985, over 200 studies had been conducted on the social and psychological aspects of sterilization in both developed and developing countries,[2] but only six pertained specifically to countries in Sub-Saharan Africa.

Some researchers have argued that the potential acceptance of permanent forms of contraception in Africa is very limited,[3] while others claim that interest in such methods is increasing.[4] Empirical data addressing this question are lacking. A number of knowledge, attitude and practice studies have been conducted to assess the potential acceptability of sterilization in specific African countries.[5] In addition, a few reports are available from selected African countries on the demographic characteristics of clients or on clinical aspects of the sterilization procedure.[6] However, little else is available on this topic.

The scarcity of information from Sub-Saharan Africa is particularly notable with regard to the social and psychological aspects of sterilization: Studies on sources of information, factors in the decision-making process, attitudes toward the quality of service, perceived consequences of tubal ligation on health and marital relations, and satisfaction (or regret) over the operation are lacking. The only published data on these topics come from focus-group research conducted in Zaire[7] and Kenya.[8] Yet because of the nature of focus groups, one cannot derive quantitative results on any of the variables studied.

This article is one of the first quantitative follow-up studies of acceptors of tubal ligation to focus on the social and psychological aspects of female sterilization in a Sub-Saharan country. However, it should be taken as a case study from one country; its results cannot necessarily be generalized to other parts of the African continent.

We must consider our findings in the context of the social and political climate for family planning in Zaire. The country is strongly pronatalist. Women aspire to have and do have, on average, at least six live births.[9] Zaire is typical of Sub-Saharan Africa in that fertility is highly valued.

John Caldwell and Pat Caldwell contend that traditional African religious values have helped to sustain high fertility in two ways.[10] First, in the traditional value system, fertility is equated with both virtue and spiritual approval, and reproductive failure or cessation of fertility is associated with sin. Second, filial piety and material homage to the older generation are emphasized, so that high fertility is rarely disadvantageous.

This pronatalist attitude is reinforced by a number of factors, including high rates of infant mortality, low levels of female education, the high social status associated with large families and the positive economic value of children, particularly in rural settings. While some change in attitudes has occurred, and young people in urban areas rarely aspire to the 10–12 children their parents may have had, few would voluntarily limit fertility to 2–3 children. Among the very poorest, one hears the claim that "children are our only wealth."

In 1972, President Mobutu Sese Seko publicly voiced support for the concept of birthspacing for health reasons. This led to the formation of a private family planning association (affiliated with the International Planned Parenthood Federation) in 1973 and to a government-supported national family planning program in 1983. These efforts were complemented by the work of Protestant missionary groups in selected sites throughout Zaire during the late 1970s and 1980s.

By 1990, modern contraceptives were

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available from clinic-based programs in the principal cities of the country, as well as in a substantial number of rural health zones served by a large rural health project and other, pilot projects. The concept of birthspacing as a health intervention has been so widely promoted that *naissances désirables* (the local term for family planning, which means "desirable births") has become a household term in many parts of the country.

Nonetheless, the family planning movement is still in its infancy. Although the government voices support for birthspacing, it has stopped short of establishing an official population policy. A lack of infrastructure, combined with administrative difficulties, has diminished the potential effectiveness of efforts to increase access to modern methods. It is not uncommon, for example, for clinics to run out of contraceptives.

Data from several studies conducted in widely dispersed locations in Zaire since 1980 confirm that the population is generally aware of family planning. In some 10 sites studied to date, over 80 percent of the female respondents had heard of at least one modern contraceptive method; with one exception, two-thirds or more had heard of female sterilization.[11] Actual use of modern contraceptives is still very low among this population, however. According to the 1982–1984 prevalence survey, use of modern methods ranged from two percent to 11 percent of married women of reproductive age in the four urban and two rural sites studied; one percent of women at each of five of the sites had undergone tubal ligation.[12] There is evidence of a slightly higher prevalence of female sterilization in areas where the operation has been most readily available (Vanga, six percent in 1983; Matadi, eight percent in 1989).[13] However, these are clearly the exceptions and not the rule.

Methodology

• *Sampling*. Strict random sampling was not feasible in our study for three reasons: the large size of the country, communication difficulties resulting from the various languages and dialects spoken, and the lack of centralized data on sterilization procedures performed at various sites.

Instead, we first identified all hospitals and clinics in Zaire where at least 50 tubal ligation procedures were performed between January 1984 and December 1986 (i.e., 1–4 years prior to the study), and where the names and addresses of the clients were on record. A list of such institutions was drawn up, based on information obtained from local organizations working in family planning and from individuals familiar with health programs throughout Zaire; this informal approach was used in the absence of any official listing. Twelve such sites were identified, half of which were urban (cities of 100,000 inhabitants or more) and half rural (a 13th emerged, but too late to be included in this study).

At each site, a list containing the names and addresses of the eligible respondents was compiled; women who lived in remote areas were excluded for logistic reasons. Women whose last births were by cesarean section were also excluded, because their decision to have a tubal ligation may have been based on compelling medical reasons. In sum, the eligible respondents were women who had undergone tubal ligation approximately 1–4 years before the interview, who lived a reasonable distance from the selected hospital and whose last delivery was not by cesarean section.

• *Organization of Fieldwork*. The logistics of conducting the fieldwork were challenging for two reasons: The 12 sites were geographically scattered throughout this vast country, and nine different languages (or dialects) were spoken at the 12 sites under study. The questionnaire was developed in French by the Projet des Services des Naissances Désirables (PSND, the national family planning program), with technical assistance from Tulane University in the United States.

At each site, one supervisor and one female interviewer were selected to work on the study. These two-person teams were brought to Kinshasa (the capital city) for a two-week training course on general study procedures and interviewing techniques. This training took place in two shifts—the first in December 1987, the second in February 1988.

Once trained, the teams returned to their sites to translate the questionnaire into the local language and to pretest it. After necessary modifications, the interviewer attempted to contact all eligible respondents. The interviewing was conducted in private in the respondent's home. If a potential respondent was away from her home at the initial visit, the interviewer tried again later the same day or the next day (although this was not possible if an eligible respondent living in a fairly isolated area was traveling at the time of the first contact). The fieldwork schedule varied by site, with interviewing conducted during 1988.

Although the interviews were conducted in the local language at each site, the interviewers wrote the responses to open-ended questions in French. Moreover, the structure of the questionnaires (numbering and layout of questions) was identical for all sites. The questionnaires were verified in the field by the supervisor and then sent to Kinshasa for coding, editing and analysis at the PSND.

Of the 12 initial sites, 10 completed the data collection (i.e., attempted to contact all eligible respondents), one partially completed it and one did not provide data within the time limits of the study.

Sample Characteristics

A total of 453 women who underwent tubal ligation were interviewed from 11 sites throughout Zaire (Table 1, page 102). About one-third of these women had never attended school, and about one-half had attended or completed primary school or homemaker school. Only 15 percent had gone beyond primary school. Of the total group, 58 percent said they were able to read.

Most acceptors were either Protestant (57 percent) or Catholic (34 percent). The proportion of respondents who were Protestant is higher than the proportion of total Zairians who are Protestant. This reflects the fact that many of the sterilization programs in Zaire have been developed in conjunction with Protestant mission hospitals.

Just over 60 percent of the women reported having some type of remunerative work, which could include agricultural work or selling items in a marketplace. Ninety-two percent were married or living in union, and six percent were previously married; only two percent had never been married. Of the 415 women married or in a union, 77 percent were in monogamous unions, compared with 23 percent in polygamous unions. The husband's level of education was, on average, much higher than the wife's (not shown): Only nine percent of husbands had never attended school, and 32 percent had attended secondary school or gone further.

Calculations from data collected indicate that the average age at first pregnancy was 17.6 and the average age at sterilization was 36.9. By the time of their sterilization procedure, acceptors had had an average of 8.5 live births. Over half had experienced the death of at least one child, bringing to 7.3 the average number of living children. As Table 1 shows, 64 percent of the respondents had 5–8 living children. Almost all respondents (98 percent) had at least one son and at least one daughter. In addition, 52 percent had at least one other (foster) child in their care.

About three-quarters of the women had undergone the sterilization postpartum, while about one-quarter had had an interval procedure (not shown). The proportion of postpartum versus interval cases differed markedly by site. On average, women wait-

Table 1. Among women who had had a tubal ligation, number and percentage distribution of background characteristics, Zaire, 1984–1986

Characteristic	N	%
Total	**453**	**100.0**
City/town (site)		
Kananga	47	10.4
Karawa	74	16.3
Kaziba	31	6.8
Kikwit	11	2.4
Kimpese	57	12.6
Kinshasa	23	5.1
Lubumbashi	45	9.9
Matadi	51	11.3
Nyankunde	42	9.3
Oicha	30	6.6
Vanga	42	9.3
Education		
None	153	33.8
1–3 years primary	92	20.3
4–6 years primary	101	22.3
Homemaker school	40	8.9
1–2 years secondary	31	6.8
3–6 years secondary	33	7.3
Beyond secondary	3	0.7
Literate		
Yes	263	58.1
No	190	41.9
Religion		
Protestant	256	56.5
Catholic	156	34.4
Kimbanguiste	14	3.1
Muslim	5	1.1
Other/None	22	4.8
Remunerated work		
Yes	280	61.8
No	169	37.3
No information	4	0.9
(continued)		
Marital status		
Currently married/in union	415	91.7
Monogamous	321	70.9
Polygamous	94	20.8
Previously married	29	6.3
Never-married	9	2.0
Age at interview		
20–24	2	0.4
25–29	2	0.4
30–34	55	12.1
35–39	133	29.4
40–44	165	36.4
45–49	51	11.3
≥50	6	1.3
Don't know	39	8.6
No. of living children		
0–2	9	2.0
3–4	35	7.7
5–6	102	22.5
7–8	187	41.3
9–10	100	22.1
≥11	20	4.4
Sex of living children		
At least one son	445	98.2
No sons	8	1.8
At least one daughter	445	98.2
No daughters	8	1.8
Number of foster children		
0	216	47.7
1	82	18.1
2	79	17.4
≥3	76	16.8

ed 3.3 days between delivery and the operation; however, five percent had it the same day they delivered. One-half of the postpartum group decided to have their babies at the hospital so they could have the tubal ligation done at that time. One-quarter of women who had had an interval procedure said their hospital stay was less than 24 hours, one-fifth had to stay 25–47 hours and over one-half, 48 hours or more. Two respondents reported that the operation had failed and that they had subsequently become pregnant.

Making the Decision

Sixty percent of the women reported that their last pregnancy was wanted, while 10 percent said that it was mistimed and 30 percent said it was not wanted.

Half of the acceptors had first learned about tubal ligation from medical personnel: a nurse (20 percent), some other health worker (21 percent) or a doctor (nine percent). Among other sources of information were another woman who had had a tubal ligation (17 percent), a friend (14 percent), their husband (seven percent) or some other family member (seven percent). Less than four percent had first heard of sterilization through the mass media. In fact, the proportion who had ever seen or heard about tubal ligation in the media was low, with 22 percent citing the radio as the most common media source for information. About 19 percent indicated that they had ever seen or heard about tubal ligation on posters and less than nine percent each cited brochures, television or newspapers.

The vast majority of married women (95 percent) discussed the operation with their husbands before having it done. This is not surprising, considering that most hospitals in Zaire require the husband's signed consent before the procedure can be done. Ninety-five percent reported that their husbands supported the idea and one percent said their husbands were indifferent. Among the four percent of husbands who did not support the idea, the main objection was a desire for more children.

Forty percent of the women talked to at least one other sterilized woman before having their own operation. On average, one or two women were consulted, and 93 percent of the women who were consulted described their experience in positive terms.

Most of the respondents had also discussed tubal ligation with a doctor (73 percent) or a nurse (69 percent). They perceived these health personnel to be favorable to tubal ligation in almost all cases. Some 25–28 percent each had discussed the operation with a friend, an older brother or their mother, and lesser proportions had discussed it with older relatives such as a father, aunt, uncle or in-law. In the majority of these cases, the person who was contacted responded favorably to the idea of sterilization, but most women did not consult relatives, perhaps because they felt they would disapprove.

The respondents were asked why they had decided to have a tubal ligation. In an effort to get the most accurate responses possible, the question was asked in three steps. The first part was open-ended: "For what reason did you decide to have a tubal ligation?" After obtaining the response, the interviewer asked the respondent, "Besides the reason you just mentioned, were there other things that prompted you to have the operation, for example . . ."; she then listed the 10 items shown in Table 2 and waited for the participant to respond to each one. After completing the list and registering the responses, the interviewer asked, "You gave one reason for having the operation and I just listed some others. Of all these, which was really the one that convinced you to have the operation?" The reason for this lengthy probing was to get beyond the socially acceptable response of "health reasons" and identify other factors that might have played a role in the decision.

Table 2 shows the proportions of women giving the various responses to all three questions. Columns 1 and 3 are percentage distributions of all women, whereas column 2 adds to more than 100 percent because the women could cite more than one reason in response to the second question. One-half of the respondents initially cited health reasons as their primary motivation, and almost one-third stated that they had decided they had enough children. The third most commonly given reason—economic difficulties—was cited by only 10 percent of the women. When asked to respond to the list of factors that might have influenced their decision, over 60 percent of the respondents cited each of those three factors as either their first reason or a contributing reason. Other reasons, mentioned by 25–47 percent of the women, were complications with the last pregnancy, the last pregnancy being unwanted, inability to tolerate other contraceptive methods, the recommendation of their doctor and lack of access to other methods.

Table 2. Among women who had had a tubal ligation, percentage who gave particular reasons, by priority of reason

Reason	Priority		
	Main reason	Contributing factors	Final reason
Health reasons	50.3	86.5	38.9
Had enough children	31.3	67.8	29.8
Economic difficulties	9.9	61.6	8.4
Doctor recommended it*	1.1	25.8*	4.4
Complications with last pregnancy	0.0	47.2	13.2
Couldn't tolerate other methods	0.0	28.0	0.2
Last pregnancy was unwanted	0.0	29.1	0.2
Lack of access to other methods	0.0	24.9	0.4
Lack of knowledge of other methods	0.0	13.0	0.0
No husband	0.0	4.6	2.9
Other	6.7	na	1.5
Don't know	0.4	na	0.0
Total	100.0	na	100.0

*This item was intended to identify those women who received a strong recommendation from their doctor. In contrast, "health reasons" included those cases where the woman felt it was good for her health but was not necessarily directed by her doctor.

Note: na=not applicable.

Interestingly, this extensive probing for the motive for the operation had little effect on the responses given to the final question. "Health reasons" and "had enough children" still emerged as the two main reasons.

Obtaining the Operation

For women deciding to have a tubal ligation, three principles are basic to informed consent: that the woman know the operation is permanent and that she will not be able to have more children; that she know of other contraceptive options; and that she make the decision of her own free will. We examined the extent to which our sample had the opportunity to practice informed consent, as measured by these three factors.

To determine whether they recognized the permanent nature of tubal ligation, all the respondents were asked if they believed they could have more children; if they believed it was necessary to use another contraceptive method to avoid pregnancy; and if they thought their sterilization was permanent. Almost all the women (97–99 percent) gave answers indicating that they understood the permanent nature of the operation; 1–2 percent of women gave the wrong answer on each of the questions, and on two questions, one percent said they did not know.

Ninety-six percent of the women had heard of at least one other contraceptive method; 91 percent knew of at least one modern method, and 85 percent knew of at least one traditional method (Table 3). However, only 38 percent had ever used a modern method, and only 46 percent had ever used a traditional one. Among women who had ever used a contraceptive, the methods most commonly used prior to sterilization were the pill (22 percent), withdrawal (20 percent) and injectables (15 percent).

To test the voluntary nature of the decision, women were asked who had recommended that they have the operation: Sixty-five percent of the respondents said that it was their own idea, 19 percent cited their husband, four percent considered it to have been a joint idea with their husband and seven percent said it was their doctor's idea (Table 4, page 104). Among women who said it was solely their own idea, 67 percent said the first person they consulted was their husband, 13 percent said they had first consulted a nurse and nine percent, a doctor.

Eighty-six percent of the women reported that they had felt no pressure to have a tubal ligation and that their decision had been made freely. Of the 14 percent who had felt pressured, 56 percent said their husband had insisted on the procedure and 37 percent reported that the pressure had come from their doctor. For 83 percent of these women, the reason for this pressure was previous difficulties with childbearing. In fact, of those who felt pressured, 75 percent agreed with the person trying to convince them. Among the few who did not, the primary reasons were the desire for more children and the fear of the operation. None of the women had received any type of monetary compensation for undergoing the operation (not shown).

In Zaire, as in many other countries, women who have a tubal ligation may not be able to obtain the operation as quickly as they would like. In the present study, the mean time between making the decision and having the operation was 4.5 months. About one-third (36 percent) of the women in our sample had had the operation within a month of the time they had made their decision; 56 percent waited 1–12 months after making the decision, and the remaining eight percent waited more than a year.

Most women who waited more than a month did so because they were pregnant (64 percent). Other reasons—none of which were mentioned by more than six percent of those who had waited—were ill health, the need for more information, child care problems, the need for rest (recuperation), economic barriers and the desire to have another child.

However, when asked specifically if they had experienced any of a list of problems in

Table 3. Among women who had had a tubal ligation, percentage who knew of or had ever used a method, and percentage distribution of ever-users, by the last method used

Method	Knew of a method (N=453)	Ever used a method (N=453)	Last method used (N=335)
Any method	**96.0**	67.1	**100.0**
Modern method	**90.4**	37.5	**48.1**
Pill	85.4	21.9	21.8
Injectables	79.3	13.2	14.9
IUD	73.1	8.6	8.1
Condom	58.7	5.1	2.4
Vaginal tablets	30.4	2.4	0.9
Foam, cream	25.8	0.2	0.0
Vasectomy	23.2	0.0	0.0
Traditional	**84.8**	46.1	**51.9**
Abstinence	84.1	18.1	12.5
Withdrawal	68.4	23.6	20.0
Rhythm	64.1	12.4	9.6
Traditional belt	58.5	3.1	1.2
Other	0.0	0.0	8.7

obtaining the operation, 27 percent mentioned a lack of money to pay for the operation; 24 percent, the problem of child care while gone; 18 percent, transportation to the hospital; four percent, a long wait at the hospital; and three percent, having to come back several times before being served.

Forty-two percent of the women lived within 30 minutes of the hospital where they had had the operation; however, one-quarter lived more than three hours away. On average, it had taken the women about two hours to get to the hospital. Their modes of transportation had included some combination of walking (46 percent), taking a taxi (26 percent), taking a bus or taxi-bus (14 percent), using personal transportation (seven percent) and taking a hospital vehicle (five percent).

Service and Side Effects

Respondents who had had an interval operation were asked about any complications they had experienced. (Because those who had had the procedure postpartum might have had difficulties differentiating between complications or pain attributable to the operation and attributable to childbirth, they were not asked this question.) Of the 122 women who had had an interval procedure, one-third had had complications in the first few days after the operation, including abdominal pain, fever, muscular contractions and severe headaches. Of those reporting complications, 80 percent had consulted clinical personnel regarding the problem.

Thirteen percent had complications that had persisted at least one month; these included heavy menstrual bleeding, abdominal pain and amenorrhea. Three-quarters of the women with these complications had consulted a doctor or nurse.

All the respondents were asked their impressions of the quality of service given by the doctors and nurses during their operation. A positive bias is inherent in this question, but we felt it important enough to include in this type of survey. Thirty-five percent judged their doctor's service to be "very good" and 64 percent said it was "good." Only one percent (six women) felt it was less than good or did not answer. The ratings for nurses were similar: 32 percent "very good;" 67 percent "good." Of the two percent (seven women) who considered the nurses to be fair or poor, five women complained primarily of their bad dispositions or attitudes.

As mentioned in the discussion on informed consent, 96 percent of the women in this study knew of at least one other method. However, in response to the question "Did someone at the hospital explain about other contraceptive methods to you before the operation?" only eight percent of the women responded affirmatively, suggesting minimal communication between the patient and those providing medical services. Among the few women answering yes, the nurse gave the information in almost two-thirds of the cases.

Table 4. Among women who had had a tubal ligation, number and percentage distribution of variables affecting voluntary decision-making

Variable	N	%
Person who recommended the operation		
Respondent	293	64.7
Husband	85	18.8
Doctor	31	6.8
Respondent and husband together	16	3.5
Friend	9	2.0
Nurse	6	1.3
Other health personnel	3	0.6
Other	10	2.2
Total	453	100.0
First person with whom the respondent discussed the idea		
Husband	195	66.6
Nurse	37	12.6
Doctor	26	8.9
Sterilized woman	16	5.5
Friend, neighbor	8	2.7
Other family member	5	1.7
Other	6	2.0
Total	293	100.0
Respondent felt pressured		
No	389	85.9
Yes	63	13.9
Don't know	1	0.2
Total	453	100.0
Person who pressured respondent		
Husband	35	55.6
Doctor	23	36.5
Mother	1	1.6
Father	1	1.6
Husband's family	1	1.6
Oldest son	1	1.6
Don't know	1	1.6
Total	63	100.0
Reason for pressure		
Difficult delivery/pregnancy	52	82.5
Had enough children	5	7.9
Economic reasons	2	3.2
Other	4	6.4
Total	63	100.0
Respondent agreed with reason for pressure		
Yes	47	74.6
No	16	25.4
Desired more children	9	14.3
Fear of the operation	6	9.5
Don't know	1	1.6
Total	63	100.0

When the respondents were asked if they had posed questions to either the doctor or nurse about tubal ligation prior to the operation, only 15 percent responded affirmatively, and virtually all of these respondents felt their questions were satisfactorily answered. When asked how the service might be improved, 73 percent of the respondents had no suggestions or recommendations. Among the remaining 27 percent, the most frequently mentioned suggestions had to do with "professional conscience" (four percent), meaning, for example, that health personnel should be on time, respect commitments and be attentive to patient's needs. Between two percent and three percent of the respondents had each of the following suggestions: avoid failures, have tubal ligation patients isolated from other patients, make the hospital cleaner, reduce the cost of the operation and ensure adequate equipment and supplies. One percent mentioned that the incision should be made smaller.

Perceived Consequences

All respondents were asked a series of questions to determine if they had noticed any changes after the operation with regard to their health, marital situation and general well-being (Table 5). While such changes might have resulted from totally independent causes, the question was intended to identify *perceived* effects. The possible responses to most of these questions were "better," "worse" or "the same" (and "don't know," if the respondent volunteered this answer). In the large majority of cases across all these variables, the respondents reported that they had experienced no change or a change for the better. This was true for 90 percent regarding general health, 86 percent regarding capacity to do physical work and 92 percent regarding their disposition. Almost one-half of the women reported a weight gain after the operation, which in Zaire (especially in rural areas) could be considered positive; 17 percent reported weight loss.

Over one-half of the respondents had experienced no change in their menstrual cycles, and those reporting change were about evenly divided in the direction of the change. For example, 18 percent reported that their cycles were now shorter, compared with 23 percent who said they were longer; 22 percent claimed their period lasted more days than before, while 18 percent said it now lasted fewer days; and 23 percent said that their flow had increased since the operation, while 22 percent claimed it had decreased.

Approximately two-thirds of the women reported that the frequency of their sexual relations had not changed, while about one in five stated that they now had intercourse more frequently, and one in seven said they had intercourse less frequently. In addition, one in five women found sex more satisfying than before the operation, while one in 10 said it was less satisfying.

The focus-group research on attitudes toward tubal ligation pointed to an underlying fear among women that if they underwent the procedure, they risked losing their husbands.[14] Among the 415 married women in this study, 93 percent reported that there had been no change in their husbands' behavior toward them. Nonetheless, 13 percent of the married respondents said that their husbands had tried to have or had had more children with other women following the tubal ligation, and another six percent said they did not know if their husbands had tried to do so.

Women in polygamous unions were more likely to report that their husbands had tried to have children with other women than were women in monogamous unions. Older women were no more likely than younger women to perceive a change in their husbands' behavior or to have husbands who had had children with other women.

The respondents were asked two questions regarding their general satisfaction with the procedure: "Are you glad you had a tubal ligation?" and "Do you have any regret?" Of the total sample, 88 percent claimed to be glad, but in response to the second question, 14 percent said they had some regret. (The discrepancy may result from a woman's being generally satisfied with the operation but having some small regret over it.) The 62 women who expressed some regret were asked the reason (an open-ended question). The most common answers were that they had fewer children than they would have liked (57 percent); they felt it was against God's will (eight percent); they had been sickly since the operation (seven percent); their husband did not love them anymore (five percent); they had experienced pain (five percent); and other/did not know (19 percent).

The factors associated with regret are shown in Table 6 (page 106). Women were significantly more likely to experience regret if any of the following conditions existed: they had five or fewer children; they had wanted their last pregnancy; the idea to have the operation was someone else's; the operation was recommended by their doctor; they had felt pressured into having the operation; they felt their health was worse; their ability to do hard work had decreased; they felt that their husbands' behavior towards them had changed; or their husbands had tried having children with another woman.

Two other variables approached significance: Women who had no education and who had not talked with a woman who had had the operation were probably more likely to experience regret. Age, religion and marital status of the woman at the time of the operation were not associated with regret.

Table 5. Among women who had had a tubal ligation, number and percentage distribution of perceived effects

Effect	N	%
General state of health		
Better	219	48.3
Worse	47	10.4
Same	187	41.3
Don't know	0	0.0
Capacity for physical work		
Stronger	174	38.4
Less strong	63	13.9
Same	216	47.7
Don't know	0	0.0
Disposition		
Better	109	24.1
Worse	32	7.1
Same	307	67.8
Don't know	5	1.1
Weight change		
Gained	222	49.0
Lost	78	17.2
Stayed the same	152	33.6
Don't know	1	0.2
Duration between menstrual cycles		
Shorter	82	18.1
Longer	102	22.5
Same	261	57.6
Don't know	8	1.8
Number of days of bleeding		
Greater	101	22.3
Less	80	17.7
No change	264	58.3
Don't know	8	1.7
Menstrual flow		
Increased	103	22.7
Decreased	99	21.9
No change	239	52.8
Don't know	12	2.6
Frequency of intercourse		
More frequent	93	20.5
Less frequent	64	14.1
Same	279	61.6
Don't know	17	3.8
Satisfaction with sex		
Greater	95	21.0
Less	43	9.5
No change	297	65.6
Don't know	18	4.0
Husband's behavior toward wife*		
Changed	27	6.5
Didn't change	384	92.5
Don't know	4	1.0
Husband tried to have children elsewhere*		
Yes	52	12.5
No	339	81.7
Don't know	24	5.7
Total	453	100.0

*Percentages are based on the 415 married respondents.

The variables that were significant (and that approached significance) were entered into a multiple logistic regression analysis (Table 6, column 2). Women who were still found to be at significant risk for regret after other variables in the model were controlled for were those who had five or fewer children; those who did not consider the operation to have been their own idea; those who had felt pressured into having the operation; and those whose husbands had tried to have children with other women after the operation. Interestingly, women whose husbands had recommended the operation were at least as likely to experience regret as those whose doctors had recommended it.

Almost two-thirds of the women interviewed had told other people (besides their husbands) that they had had the operation (not shown). One-half had recommended it to others. Among those who had not, the main reason was that they considered the matter to be private (48 percent). Other reasons given were that they did not want to be responsible for causing problems in other households (nine percent), did not approve of tubal ligation themselves (five percent) or were afraid of being mocked (three percent). Nine percent of those who had not discussed their tubal ligation said they would provide information if they were asked about it.

Discussion

The findings from this survey constitute one of the first studies on the social and psychological aspects of tubal ligation in Africa. Given the dearth of information on this topic from Africa, there may be a tendency to generalize these results to other countries in the region. We want to emphasize that this is not appropriate, given that the climate for contraceptive sterilization differs greatly among countries. For example, previous focus-group research showed that there is much less acceptance of tubal ligation as a contraceptive method in Zaire than in selected districts of Kenya.[15] However, the present study may reflect social and psychological processes related to sterilization in other cultural contexts.

The results provide a number of insights into the factors leading to and the consequences of tubal ligation for women in Zaire. Acceptors tend to be relatively advanced in the reproductive cycle (with a mean age of 36.9) and have an average of 7.3 living children at the time of the operation. The primary reason women gave for their tubal ligation was their health. Even when probed, less than 10 percent of the women stated that their primary motivation was economic difficulty.

Table 6. Among women who had had a tubal ligation, percentage who experienced regret and odds ratio after multiple logistic regression, by selected variables

Variable	%	Odds ratio
Total	**14.0**	**na**
Age at sterilization		
20–24	50.0	na
25–29	18.8	na
30–34	17.2	na
35–39	11.5	na
40–44	12.2	na
≥45	7.1	na
Education		
None	19.6*	1.0
1–3 years primary	12.0	0.7
4–6 years primary	8.9	0.5
Beyond primary	11.2	0.5
Religion		
Catholic	11.5	na
Protestant	13.7	na
Other	22.0	na
Marital status		
Married/in union	14.2	na
Single	7.9	na
No. of living children		
1–2	22.2***	5.4§,**
3–5	26.6***	§
6–8	12.2	1.6
≥9	7.5	1.0
Attitude toward last pregnancy		
Wanted	18.4***	1.0
Mistimed	11.1	0.7
Unwanted	5.1	0.6
Person who recommended the operation		
Respondent (with or without husband)	5.8	1.0
Medical personnel	25.0***	5.3**
Husband	35.1***	6.1**
Don't know	10.0	na
(continued)		
Had spoken to other woman with tubal ligation		
Yes	9.4	1.0
No	16.5*	1.5
Don't know	0.0	na
Reason for the operation		
Doctor recommended	30.0***	1.0
Health reasons	17.4	2.6
Had enough children	6.6	2.9
Other	5.6	1.4
Don't know	42.9	2.0
Respondent felt pressure		
No	8.0	1.0
Yes	49.2***	2.8
Health status after the operation		
Better	12.8	1.0
Worse**	25.5***	1.7
Same	11.8	1.9
Capacity for physical work		
Increased	11.5	1.0
Decreased	27.0***	1.3
Same	11.6	2.0
Husband's behavior toward wife†		
Changed	40.7***	1.0
Didn't change	12.5	0.4
Husband tried to have children elsewhere†		
Yes	40.4	1.0
No	9.1***	0.3**
Don't know	30.4	na

*Statistically different from other options at p<.10 by Pearson's chi-square test.

**Statistically different from other options at p<.05 by likelihood ratio estimate.

***Statistically different from other options at p<.001 by Pearson's chi-square test.

†Percentages are based on married women only.

§The categories for 1–2 children and 3–5 children were combined for odds ratio analysis.

Note: na=not applicable.

Because female sterilization is relatively new as a contraceptive option in Zaire, less emphasis has been given to the issue of informed consent in that country than in those where the method is widely accepted. Even so, the acceptors in this study did relatively well on two of the three indicators of informed consent: Over 96 percent knew tubal ligation was a permanent method and knew of at least one other contraceptive method.

However, 14 percent of the acceptors reported that they had felt pressured into having the operation, either by their doctors (which may indicate that there were compelling medical reasons) or by their husbands, who are traditionally the chief decision-makers in Zairian households. Future training of health personnel needs to emphasize the informed consent issue. The importance of reviewing alternative contraceptive methods prior to the operation (even if the client says she has already decided on the operation or knows of other methods already) should also be stressed.

The current study confirms the finding in the focus-group research that there is relatively little information on sterilization circulating through either the mass media or informal communication channels of Zaire.[16] Only 40 percent of the acceptors consulted with a woman who had undergone tubal ligation prior to the operation, compared with 80 percent in a similar study conducted among sterilization acceptors in El Salvador in 1984.[17] Moreover, only 50 percent of the Zairian acceptors had recommended the operation to others. In short, until sterilization becomes integrated into ongoing family planning programs and is more widely accepted by the population, the information, education and communication burden falls squarely on the shoulders of the service providers. Future programs in Zaire (and other African countries where contraceptive tubal ligation is just being introduced) must be designed with a strong information-education-communication component to compensate for the scarcity of information available through the mass media or informal communication channels.

In the majority of follow-up studies of sterilized women conducted in Latin America or Asia, the mean number of living children at the time of the operation averaged 3–4, compared with 7.3 in the current study. This confirms Odile Frank's contention that tubal ligation as currently practiced in Sub-Saharan Africa has little demographic impact on that region.[18] It also casts a slightly different light on the issue of choosing to undergo a sterilization procedure. This study does not describe a group of women who deliberately sought out a means of limiting family size to conform to an emerging small family norm. Rather, it describes the experience of a group of women who for the most part had had seven or more live births and who for health reasons believed it was best to stop bearing children. From the vantage point of some societies, this would be an easy decision, but these women live in a society that strongly disapproves of the unnecessary or premature cessation of childbearing.

In general, the women in this study were very positive about their operation. Most reported no change or a change for the better in their health, disposition and marital relations. The large majority were glad they had had the operation. However, the results regarding the 14 percent who had at least some regret over the operation deserve serious attention in future sterilization programs in Zaire. Future training courses should heighten awareness among health professionals that women who do not feel the operation was their own idea are more likely to experience regret. The two main sources of pressure in this study were the husband and the doctor.* Health personnel should be trained to look out for such cases and to provide additional counseling, aimed either at postponing the final decision until the woman is psychologically ready or at assisting her in accepting the reasons offered by her doctor or husband (which in this study primarily had to do with her own health, not with economic difficulties).

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*It is ironic that in the previous focus-group research, the husband (and his family) was cited as a barrier to sterilization, whereas in this study pressure from the husband to have the operation emerges as an issue. While this factor is associated with regret, it should be stressed that it was reported by a very small fraction of the total number of women.

The earlier focus-group research in Zaire indicated the generally negative attitudes that prevail with regard to contraceptive tubal ligation in this country. However, participants in those focus groups who had undergone the operation were generally positive about their experience. The current study provides quantitative results that confirm the favorable experiences of sterilization acceptors expressed in the focus groups.

This study was conducted prior to any systematic effort on the part of the national family planning program to integrate tubal ligation into the ongoing contraceptive services available at the different sites studied. It will be interesting to follow changes in the attitudes of women who undergo tubal ligation as services are expanded and the method becomes more readily accessible.

References

1. W. P. Mauldin and S. S. Segal, "Prevalence of Contraceptive Use: Trends and Issues, *Studies in Family Planning*. **19**:335, 1988.

2. S. G. Philliber and W. W. Philliber, "Social and Psychological Perspectives on Voluntary Sterilization: A Review," *Studies in Family Planning*, **16**:1, 1985.

3 J. Caldwell and P. Caldwell, "The Cultural Context of High Fertility in Sub-Saharan Africa," *Population and Development Review*, **13**:409, 1987; and O. Frank, "The Demand for Fertility Control in Sub-Saharan Africa," *Studies in Family Planning*, **18**:181, 1987.

4. E. O. Otolorin, A. A. Adetunji and J. Dwyer, "Will Voluntary Sterilization Be Accepted in Africa?" *Communiqué*, **8**:3, 1987; and J. C. Dwyer and J. M. Haws, "Is Permanent Contraception Acceptable in Sub-Saharan Africa?" *Studies in Family Planning*, **21**:322, 1990.

5. J. M. Namboze and M. L. Kakande, "Some Aspects of Knowledge and Attitudes Toward Family Planning and Sterilization on the Peri-Urban Area of Kampala, Uganda," in N. Mwaniki et al., eds., *Surgical Contraception in Sub-Saharan Africa*, Pathfinder Fund, Chestnut Hill, Mass., 1979; M.K. Mwaniki, "Perceptions and Psychological Barriers Toward Contraception," in N. Mwaniki et al., eds., *Surgical Contraception in Sub-Saharan Africa*, Pathfinder Fund, Chestnut Hill, Mass., 1979; C. D. Lwanga, "Interval Voluntary Surgical Contraception Has Advantages of Sub-Saharan Africa, *Communiqué*, **5**:6, 1984; E. O. Otolorin et al., "Attitudes of Nigerians to Voluntary Sterilization: A Survey of an Urban Population," paper presented at Surgical Contraception Quality Assurance Conference, Jos, Plateau State, Nigeria, Oct. 19–22, 1987; A. E. Omu and F. Akagbosu, "VSC attitudes, knowledge and practices, University of Benin Teaching Hospital," paper presented at Surgical Contraception Quality Assurance Conference, Jos, Plateau State, Nigeria. Oct. 19–22, 1987; and E. Landry et al., "Pilot Information and Education Project to Increase Knowledge About Vasectomy," paper presented at the 116th Annual Meeting of the American Public Health Association, Boston, Nov. 13–17, 1988.

6. J. K. Mati, "Voluntary Sterilization at Kenyatta National Hospital, Nairobi," in N. Mwaniki et al., eds., *Surgical Contraception in Sub-Saharan Africa*, Pathfinder Fund, Chestnut Hill, Mass., 1979; S. Vohra, "The Place of Female Sterilization in a Developing Country," *Ethiopian Medical Journal*, **15**:5, 1977; and Family Health International, "Surveillance of Female Sterilization in Karawa, Zaire," paper presented at the United States Agency for International Development Health/Population and Nutrition Conference, Gettysburg, Pa., June 19–20, 1984.

7. K. Chibalonza, C. Chirhamolekwa and J. T. Bertrand, "Attitudes Toward Tubal Ligation Among Acceptors, Potential Candidates and Husbands in Zaire," *Studies in Family Planning*, **20**:273, 1989.

8. J. T. Bertrand et al., "Attitudes Toward Voluntary Surgical Contraception in Four Districts in Kenya," *Studies in Family Planning*, **20**:281, 1989.

9.B. Makani, N. Kinavwidi and A. Way, *Planification Familiale, Fécondité et Santé Familiale au Zaïre 1982–1984*, Institut National de la Statistique and Westinghouse Public Applied Systems, 1985.

10. J. Caldwell and P. Caldwell, 1987, op. cit. (see reference 3).

11. Tulane University, unpublished data sets from the Zaire Family Planning Operations Research Project, New Orleans, 1985–1990.

12. B. Makani, N. Kinavwidi and A. Way, 198, op. cit. (see reference 9).

13. Ibid.; Tulane University, Family Planning Operations Research Project in Zaire, final report, New Orleans, Sept. 1990.

14. K. Chibalonza, C. Chirhamolekwa and J. T. Bertrand, 1989, op. cit. (see reference 7).

15. Ibid.; and J. T. Bertrand et al., 1989, op. cit. (see reference 8).

16. K. Chibalonza, C. Chirhamolekwa and J. T. Bertrand, 1989, op. cit. (see reference 7).

17. J. T. Bertrand, E. G. Landry and J. D. A. Zelaya, "Is Female Sterilization Voluntary in El Salvador?" *International Family Planning Perspectives*, **12**:40, 1986.

18. O. Frank, 1987, op. cit. (see reference 3).

Resumen

Según una encuesta realizada entre 1987 y 1988 entre 453 mujeres del Zaire que se habían hecho ligar las trompas, en el momento de la intervención las entrevistadas tenían una edad promedio de 37 años y siete hijos vivos. El 92 por ciento eran casadas. De ellas, el 95 por ciento había consultado al marido antes de hacerse la operación. Sólo el 40 por ciento había hablado con otra mujer que había tenido el procedimiento y menos del 25 por ciento había conversado con otros familiares o amigas sobre la operación. Las dos razones principales aducidas para la operación fueron "salud" y "tengo suficientes hijos". La mayoría de las mujeres dijo que su salud, capacidad física y relaciones matrimoniales no habían cambiado en absoluto, o incluso habían mejorado. Sin embargo, el 14 por ciento admitió cierto arrepentimiento. El sentimiento se relacionaba a haber tenido cinco hijos o menos, haber decidido esterilizarse bajo presión, y creer que el marido había tratado de tener hijos con otra mujer. Si bien las mujeres se manifestaban en general a favor de la esterilización, se mostraban renuentes a hablar abiertamente del tema con amigas y vecinas.

Résumé

Une enquête menée en 1987–1988 auprès de 453 Zaïroises ayant subi une opération de ligature de trompes a établi que ces femmes, en moyenne, étaient âgées de 37 ans et avaient sept enfants vivants au moment de l'opération. Quatre-vingt-douze pour cent d'entre elles étaient mariées et, de ces femmes mariées, 95 pour cent avaient consulté leur époux avant de se soumettre à la procédure. Quarante pour cent seulement des femmes interrogées avaient consulté d'autres femmes qui avaient subi l'opération avant de s'y soumettre elles-mêmes, et moins de 25 pour cent avaient discuté l'opération avec d'autres membres de leur famille ou avec des amies. Les deux raisons principales avancées pour justifier l'opération étaient des raisons de "santé" et de "nombre d'enfants suffisants". La plupart des femmes interrogées ont affirmé n'avoir perçu aucun changement, sinon une amélioration pour certaines, au niveau de leur état de santé général, de leur résistance à l'effort physique et de leurs relations matrimoniales. Cependant, 14 pour cent ont toutefois admis avoir éprouvé un certain regret après l'opération; ce regret était associé au fait d'avoir au plus cinq enfants, le fait de se sentir forcées de prendre leur décision ou à l'impression que leur époux avait essayé d'avoir des enfants avec d'autres femmes. Bien qu'envisageant la stérilisation de manière généralement positive, ces femmes étaient toutefois peu disposées à en parler ouvertement.

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Comment

South Asia's Future Population: Are There Really Grounds for Optimism?

By Richard Leete and Gavin Jones

Introduction

South Asia—Bangladesh, India, Nepal, Pakistan and Sri Lanka—totals over one billion people, more than one-fifth of mankind, and its countries contribute more than those of any other geographic subregion to world population growth. South Asia contains the bulk of the world's poor, and thus is an area of major concern. Even the most optimistic forecasts indicate huge growth to be almost certain over the coming decades. About 200 million persons will be added by the year 2000, even if fertility declines rapidly. Some consider that South Asia's growth rate will moderate thereafter as fertility moves toward replacement level, but evidence that the demographic transition will have run its course by then is far from convincing.

In South Asia, endemic poverty, social conservatism, the low status of women, and ethnic and religious conflicts constrain government policies, severely reducing the possibility of sustained economic growth or the development of strong family planning programs. Freedom from this combination of factors has been a major reason for the successful fertility transitions of countries in East Asia and Southeast Asia. In this article, we assess the United Nations (UN) and World Bank population projections* for this region against the realities of the South Asian context and present an alternative scenario. We conclude by considering some of the more important socioeconomic effects of rapid population growth and the implications for family planning programs.

Methodological Issues

The starting point in projecting the population is the base-year age and sex distribution, generally taken from the most recent census. Any errors contained in these data persist throughout the projection period and can seriously distort the results; age misreporting and underenumeration were severe in the 1981 censuses in South Asia. Although problems of age misreporting can be reduced using smoothing techniques,[1] problems of census underenumeration are less readily overcome.† Postenumeration surveys frequently understate levels of underenumeration, mainly because the methodology is not entirely independent of the census itself; hence, groups that are particularly difficult to enumerate, such as babies and young migrants, tend to be missed in both.‡

The UN and the World Bank use the latest census-derived age distribution and correct it for errors in age reporting. However, the World Bank corrects only for official estimates of underenumeration, if these are made, whereas the UN further adjusts on the basis of its own assessment of coverage completeness. Short-term differences between their population forecasts are almost entirely the result of differences in base population figures.

- *Assumptions.* Formulating assumptions about the components of population change becomes increasingly speculative the longer into the future one looks.[2] No single model should be applied without considering its contextual appropriateness. Nevertheless, a common approach is to assume that mortality rates continue to improve, although at a declining pace, until reaching some upper asymptote, and that fertility declines to replacement level. Net migration is presumed to follow recent trends. Although international labor migration and refugee movements have important social and economic consequences (for Sri Lanka and Pakistan in particular), they have hardly any impact on population growth in South Asia taken as a whole, and are not considered here.
- *Mortality.* Projections of mortality require judgments about the pace of improvement and the pattern that underlies the assumed level. The UN and the World Bank project mortality on the basis of life expectancy at birth and sets of model life-table survivorship ratios.[3] The UN assumes that, given a level of life expectancy at birth in the base year, there will be a five-year improvement of 2.5 years until life expectancy reaches 55 years, after which it assumes a progressively slower quinquennial gain.[4] The World Bank also assumes that future gains decrease with increasing life expectancy, with the pace determined by its current level.[5] The mod-

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*The UN makes biennial population projections for about 45 years into the future, its central projections being flanked by two variants. (See: UN, *World Population Prospects as Assessed in 1980,* Population Studies No. 78, New York, 1981; ——, *World Population Prospects: Estimates and Projections as Assessed in 1982,* Population Studies No. 86, New York, 1985; and reference 4.) The World Bank makes annual population projections for the short term and the medium term, and for up to the year 2150. (See, for example, World Bank, *World Development Report 1988,* Oxford University Press, Oxford, 1988; for a detailed account, see K. C. Zachariah and M. T. Vu, *World Population Projections, 1987–88 Edition: Short- and Long-Term Estimates,* The John Hopkins University Press, Baltimore, Md., 1988.) Although the World Bank's projections draw on statistics compiled and estimated by the UN, the benchmark data, approach and methodology differ somewhat.

†For example, in the official 1981-based projections for India, the large adjustments made for census undercoverage among 0–4-year-olds were compensated for by a downward adjustment of the population totals at older ages. (See: V. S. Verma, *Population Projections for India, 1981–2001,* Census of India 1981, Series 1, New Delhi, 1984.) Although this type of approach avoids age distortions in the projected age distribution, it also gives rise to errors in the projected totals.

‡Severe age misreporting and underenumeration of young children have important implications for fertility estimates for South Asian countries made using reverse survival techniques. These problems are not fully overcome simply by using smoothed populations, and frequently underestimate true fertility levels. (See J. R. Rele, "Fertility Levels and Trends in India, 1951–81," *Population and Development Review,* 13:513, 1987.)

eled rate of change is similar to the UN assumption, but is allowed to vary according to whether more or less than 70 percent of females are enrolled in primary school.

Table 1. United Nations and World Bank projections of life expectancy at birth and total fertility rate, by period being forecast and year forecast was made, according to sex and country

Sex and country	Forecast period and year it was made											
	1985–1990				1995–2000				2020–2025			
	1980	1982	1984	1987–1988	1980	1982	1984	1987–1988	1980	1982	1984	1987–1988
LIFE EXPECTANCY												
United Nations												
Males												
Bangladesh	50	50	50	51	55	54	54	55	65	62	62	65
India	54	55	58	58	59	59	62	62	67	67	70	70
Nepal	49	49	49	52	53	53	53	57	64	62	62	67
Pakistan	55	53	53	57	59	57	57	61	67	66	66	70
Sri Lanka	66	68	68	68	68	70	70	71	71	73	73	75
Females												
Bangladesh	49	49	49	50	54	53	53	55	66	63	63	66
India	53	54	58	58	58	58	63	63	69	69	74	74
Nepal	47	47	47	50	52	51	51	56	64	62	62	68
Pakistan	54	51	51	57	58	56	56	62	69	66	66	72
Sri Lanka	70	71	72	73	72	74	75	75	77	78	79	79
World Bank												
Males												
Bangladesh	u	u	50	51	u	u	54	54	u	u	63	63
India	u	u	57	57	u	u	61	61	u	u	67	67
Nepal	u	u	48	48	u	u	51	51	u	u	60	60
Pakistan	u	u	53	53	u	u	56	56	u	u	64	64
Sri Lanka	u	u	69	68	u	u	71	69	u	u	74	72
Females												
Bangladesh	u	u	51	50	u	u	56	55	u	u	67	66
India	u	u	57	57	u	u	62	62	u	u	71	71
Nepal	u	u	47	47	u	u	52	52	u	u	64	64
Pakistan	u	u	51	51	u	u	56	56	u	u	67	67
Sri Lanka	u	u	73	73	u	u	75	75	u	u	78	78
TOTAL FERTILITY RATE												
United Nations												
Bangladesh	5.7	5.5	5.5	5.5	4.5	4.3	4.3	4.7	2.3	2.5	2.5	2.3
India	3.9	3.8	3.7	4.5	3.1	2.9	2.9	3.7	2.0	1.9	1.9	2.1
Nepal	5.8	5.8	5.8	5.9	4.9	4.9	4.9	5.1	2.5	2.5	2.5	2.3
Pakistan	5.2	5.3	5.3	6.5	3.9	4.1	4.1	5.2	2.3	2.3	2.2	2.3
Sri Lanka	3.1	2.9	2.9	2.7	2.4	2.3	2.2	2.3	2.0	1.8	1.8	2.1
World Bank												
Bangladesh	u	u	6.3	5.3	u	u	5.4	3.9	u	u	2.8	2.3
India	u	u	4.2	4.2	u	u	3.1	3.2	u	u	2.2	2.2
Nepal	u	u	6.2	6.2	u	u	5.5	5.6	u	u	3.1	3.1
Pakistan	u	u	5.8	6.3	u	u	5.0	5.1	u	u	2.8	2.8
Sri Lanka	u	u	3.1	3.0	u	u	2.4	2.4	u	u	2.1	2.1

Note: u=unavailable

The UN and World Bank forecasts of life expectancy at birth for a particular country can differ sharply (see Table 1). The main differences in their most recent assessments, the more optimistic UN forecasts for Nepal and Pakistan, are only partly explained by differences in their base-period estimates. In general, the UN mortality projections for South Asia have become more optimistic, and envisage a modernization of mortality levels over the next three decades.

Is such optimism justified? Although public health measures have controlled some infectious diseases, such as malaria and tuberculosis, other diarrheal and infectious diseases are still prevalent in parts of South Asia. Forecasts of further improvements implicitly assume better nutrition, sanitation and housing, as well as a progressive reduction in poverty through general welfare gains. However, although the economies of India and Pakistan have performed better in recent years, the South Asian economies as a whole may not be strong enough to sustain continuous and rapid welfare gains. Moreover, their health and welfare programs are not as far-reaching as those that have been responsible for low levels of mortality in China, for example. The available data are insufficiently robust to establish how much the South Asian populations were affected by economic recessions and by localized droughts and famines during the 1980s. Future gains in life expectancy may well be checked at times, and even reversed.

- *Fertility.* Projections of fertility require one to make judgments about the pace of change and about the age pattern of the underlying fertility rates. In South Asia, fertility is more important in the growth equation and generally more difficult to forecast than is mortality. A given proportionate error in fertility estimates has a far greater impact on subsequent population size than the same proportionate error in mortality estimates.

The UN uses tables of model paths of decline in the gross reproduction rate,[*] with replacement-level fertility as a normative target.[6] The length of time needed to reach replacement is determined by considering factors such as fertility in the base year, the level of socioeconomic development, cultural and value systems, population size and the extent of contraceptive use. Given a particular path of decline in the gross reproduction rates, the underlying pattern of age-specific fertility rates for the assumed levels is determined from a regional model.

The World Bank's starting point is an assumption about the year in which a country's net reproduction rate[†] will reach unity. In its 1987–1988 assessment, this was determined on the basis of female life expectancy at birth and the estimated total fertility rate (TFR) during 1985–1990, changes in the birthrate between 1970 and 1980, and contraceptive prevalence. Fertility decline is projected to be slow at first, when levels are high, and to pick up when levels are somewhat lower. The underlying age pattern is determined through the use of the World Bank's model.

In the fertility projections prepared in

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[*] The gross reproduction rate represents the average number of daughters born to women of reproductive age, subject to currently prevailing age-specific female birthrates. It is a measure of the extent to which the population of females of childbearing ages is replacing itself, without taking into account the effects of mortality.

[†] The net reproduction rate (NRR) represents the average number of daughters born to women of reproductive age, subject to currently prevailing age-specific female birthrates and female survivorship rates. It is a measure of the extent to which the population of females of childbearing ages is replacing itself, taking into account mortality up to the end of the reproductive ages. When the NRR equals 1.0, this means that a generation of mothers is producing sufficient daughters to exactly replace itself.

Table 2. Population projections (in millions) for countries of South Asia by the United Nations and World Bank, by year of assessment, according to country

Country	Projection year and year of assessment											
	1985				2000				2025			
	1980	1982	1984	1987–1988	1980	1982	1984	1987–1988	1980	1982	1984	1987–1988
UNITED NATIONS												
South Asia	**987**	**997**	**993**	**1,007**	**1,293**	**1,294**	**1,294**	**1,399**	**1,722**	**1,681**	**1,717**	**2,007**
Bangladesh	101	101	101	101	148	146	146	151	223	219	219	235
India	753	761	759	769	961	962	964	1,043	1,234	1,189	1,229	1,446
Nepal	16	16	16	17	23	23	23	24	34	34	34	35
Pakistan	100	102	100	103	140	143	141	162	206	213	210	267
Sri Lanka	16	16	16	16	21	21	20	19	27	26	24	24
WORLD BANK												
South Asia	**u**	**u**	**994**	**994**	**u**	**u**	**1,336**	**1,326**	**u**	**u**	**1,871**	**1,825**
Bangladesh	u	u	103	101	u	u	157	140	u	u	266	205
India	u	u	765	765	u	u	994	996	u	u	1,309	1,312
Nepal	u	u	17	17	u	u	24	24	u	u	40	41
Pakistan	u	u	93	96	u	u	140	146	u	u	229	242
Sri Lanka	u	u	16	16	u	u	21	20	u	u	27	26

Note: u=unavailable.

1984, the World Bank assumed substantially higher TFRs for Bangladesh, Nepal and Pakistan around the year 2000 than did the UN (Table 1), partly because it estimated higher base-year TFRs and partly because it assumed a less rapid decline. In its 1987–1988 projections, the World Bank sharply lowered its estimates of Bangladeshi fertility, both for the late 1980s and for the year 2000, bringing the former (but not the latter) in line with UN estimates.

The fertility levels assumed by the UN were subject to considerable revisions between 1984 and 1987–1988. Its overoptimistic 1984 assessments of the probable level of fertility in India and Pakistan at the year 2000 have been revised sharply upward in the light of slower-than-expected fertility declines. (Indeed, in the case of Pakistan, there has been no proven fertility decline at all.) In its 1988 assessment, the UN assumes that most South Asian couples will be having an average of about 3.5 children or more by the year 2000. But the upward revision in fertility projections to the end of this century has not been carried forward to the period 2020–2025, for which earlier fertility projections remain essentially unchanged. In other words, the statistically tidy progression to replacement level has been maintained, through the assumption that the pace of fertility decline would quicken in the first quarter of the next century. The World Bank's fertility assumptions are similar, except that it forecasts significantly greater declines by the year 2000 in Bangladesh and India. Both organizations give credence to the idea that fertility will tend towards a two-child norm in the first quarter of the next century.

Analyzing the Projections

The effect of the upward revisions in the UN's assumed future fertility (and life expectancy) is that the more recent the assessment, the larger South Asia's population is expected to be (see Table 2). Thus, in its 1980 assessment, the UN forecast that India's population would be 40 million short of 1 billion in the year 2000, while in its most recent assessment it projected India's year-2000 population to be 1.043 billion. The proportionate increase in the forecasts for Pakistan over the same period is even greater. As a result of the revisions made over the past eight years, South Asia's population is now forecast to be more than 100 million larger by the year 2000, and almost 300 million larger by 2025, than had been projected in 1980.

Differences in projections for South Asia in the most recent assessments are brought into sharper focus in Table 3. In the base year of 1985, there is little difference between the two projections except that the World Bank's population base for Pakistan is a remarkable seven million (seven percent) smaller. The World Bank's assumption of a more rapid drop in fertility in Bangladesh and India leads to an increasing disparity between its projections and those of the UN.

The UN and World Bank projections imply that annual growth rates will fall sharply for each of the countries in South Asia between 1985 and 2025. Although replacement-level fertility will be attained sometime during the first quarter of the next century, annual population growth rates will remain at or above one percent, because of age-structure effects. This, of course, means that the population will continue to grow significantly for several decades after 2025.

Although population projections are not predictions, projections prepared by international agencies are frequently used as "most likely" scenarios, since these agencies are in a better position than most to evaluate the trends in the components of population change and their underlying determinants. The UN and World Bank projection models assume progression towards a stationary state, but is the application of such optimistic and mechanical models to each of the countries of South Asia appropriate? Could it reflect an unwillingness to entertain the serious implications of higher fertility scenarios? Although it is commendable to maintain a dispassionate perspective and avoid alarmism, creating a false sense of inevitability is not necessarily desirable.

For example, it is not self-evident that South Asian fertility trends are on a path that will inevitably lead to replacement level within a few decades. For some of the South Asian countries, that level appears inconsistent with prevailing value systems, as well as with the political and religious contexts within which family planning programs and population policies are being implemented. Considerable diversity in fertility levels in the short and medium term is at least as likely an outcome as convergence on replacement level.

Women's status and their lack of opportunity to engage in fulfilling roles other than childbearing is generally accepted as a crucial

Table 3. Difference between World Bank and United Nations population projection for South Asia,* by projected year, according to country

Country	1985		2000		2025	
	Diff. (in millions)	% diff.	Diff. (in millions)	% diff.	Diff. (in millions)	% diff.
Total	**–12.4**	**–1.3**	**–72.7**	**–5.2**	**–181.7**	**–9.1**
Bangladesh	–0.6	–0.5	–10.8	–7.2	–30.2	–12.9
India	–4.0	–0.5	–46.7	–4.5	–133.8	–9.3
Nepal	–0.4	–2.3	0.4	1.7	6.1	17.5
Pakistan	–7.1	–6.8	–16.3	–10.0	–25.2	–9.4
Sri Lanka	–0.3	–1.7	0.7	3.7	1.5	5.9

*Expressed as UN projections subtracted from World Bank projections (1987–1988 assessment).

Table 4. Selected socioeconomic indicators, by country, according to year

Country	% of labor force in agriculture		% urban		% of women enrolled in secondary schooling		GNP per capita (in $U.S.)	% of married women 15–49 using a method	Infant deaths per 1,000 live births
	1965	1980	1965	1985	1965	1985	1986	1985	1986
Bangladesh	84	75	6	18	3	10	160	25	121
India	73	70	19	25	13	24	290	35	86
Nepal	94	93	4	7	2	11	150	15	130
Sri Lanka	56	53	20	21	35	67	400	62	29
Pakistan	60	55	24	29	5	9	350	11	111

Source: World Bank, *World Development Report 1987*, Oxford University Press, Oxford, 1987; and ——, *World-Development Report 1988*, Oxford University Press, Oxford, 1988.

determinant of fertility levels. Throughout most of South Asia, females have little freedom for independent action. Arranged marriages at young ages to husbands often considerably older, cultural proscriptions against working outside the home, reliance on men (father, husband and sons) throughout their lives and the likelihood of destitution if they are left without sons after widowhood are powerful pronatalist forces throughout Pakistan, Bangladesh and most of India.[7]

What is the theoretical basis for the "inescapable progression to replacement level" that underlies assumptions of World Bank and UN projections? Conventional demographic transition theory would imply that fertility depends on factors such as urbanization, an expanded role of nonhousehold enterprise, the growth of education, and the effect of consumerism in increasing the demand for goods that may compete with children. Likely trends in these variables in countries such as Pakistan, Bangladesh and Nepal do not in themselves justify the assumption that replacement fertility will be attained in the foreseeable future. The assumptions are no doubt also influenced by diffusion theories, often cited to explain the sharp fertility declines in many East Asian and Southeast Asian countries.[8] Such theories emphasize the dissemination of innovations and of new ideas, assisted by developments in transport and communications. Although the potential for such dissemination is certainly increasing in the region, the impact on fertility is probably muted because of the familial and social structure and the lack of female autonomy.

Other factors frequently mentioned to explain Southeast Asian fertility declines, notably institutional factors and the independent impact of government-organized family planning programs, seem unlikely because family planning program performance has been disappointing up to this point.[9] Despite the early start on official family planning programs in India and Pakistan, a strong and meaningful institutional basis for fertility decline (observed, for example, in Indonesia[10]) seems to be lacking. In India, government backing for population control and family planning has been an integral part of each of its seven Five-Year Plans for social and economic development.[11] However, the program's uniform application across the country, its overemphasis on sterilization and its preoccupation with targets has meant that it has been least successful in those parts of the country where it is most needed.* A combination of developments, although modest, regarding a number of factors could lead to the kinds of fertility trends assumed in the UN and World Bank projections. This appears reasonable for Sri Lanka and some Indian states (such as Kerala, Tamil Nadu, Punjab and Maharastra), but for the mass of the South Asian populations it seems overoptimistic.

Has the take-off point for sustained fertility reduction been reached? The World Bank categorizes Bangladesh and Nepal among the five poorest countries of the world; India, Pakistan and Sri Lanka are somewhat better off, but are still ranked as low-income economies in the company of the 20 poorest nations of the world. World Bank indicators also show South Asian populations to be overwhelmingly rural and engaged primarily in agriculture (Table 4). Except for Sri Lanka, infant mortality rates are high and female literacy is low, as is the proportion of married women practicing contraception. Very few people are covered by old-age pensions.

Further, urbanization, the structure of employment and the extent of female education have not altered radically over the past 15–20 years. By 1985, levels of female education in Pakistan, Bangladesh and Nepal were similar to those reached 20 years earlier in Indonesia and Thailand, and were well below those reached in Malaysia and the Philippines two decades ago. Indonesia and Thailand launched their impressive fertility declines from relatively low educational thresholds, but the South Asian countries lack many of their favorable preconditions. Nor can it be assumed that once a fertility decline starts, it will necessarily continue. An initial decline, perhaps in response to later marriage caused by the growth in education, does not always lead to a continuous and sustained reduction in expected and achieved family size, as shown by the Malays in Malaysia[12] and, to a lesser extent, by countries such as Costa Rica.[13]

Family planning programs in South Asia, which have attempted to reduce fertility by increasing the availability of modern forms of birth control, have a fairly long history.[14] However, outside of Sri Lanka and some states of India, the programs have been largely ineffectual and organizationally weak, and have had little impact on fertility.† The reasons are complex, although one—the still high levels of mortality, particularly in the early years of life—is obvious enough. In the religious, social and familial context of most South Asian societies, planners and politicians, as well as the wider public, appear to be ambivalent about the more radical changes needed in the social structure and in the status of women to bring fertility rates down.‡

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*Recognition of this fact was made in 1989 by Rajiv Gandhi, then Indian Prime Minister, in his inaugural address to the 21st General Conference of the International Union for the Scientific Study of Population. (See: R. Gandhi, "Inaugural Address to the 21st International Population Conference," New Delhi, Sept. 20, 1989; excerpted in "Gandhi Addresses the World on Family Planning," *International Family Planning Perspectives*, 15:106, 1989.) In that address, Gandhi called for a de-emphasis on uniform targets throughout the country and for a greater focus on area-specific projects for reducing fertility.

†Of course, the efficacy of family planning programs cannot be assessed simply by looking for correlations between trends in contraceptive prevalence rates and crude birthrates. The divergent trends in these indicators in India between 1978 and 1985, for example, indicated the growing weight of spacing methods in the aggregate prevalence rates, but told little else. (See: W. C. Robinson, "Rising Contraceptive Prevalence and Constant Fertility: A Paradox from the Indian Programme," paper presented at the Registrar General of India/East-West Population Institute South Asia Population Conference, New Delhi, Mar. 14–20, 1989.)

‡This point is relevant in considering whether the outstanding success of the Matlab family planning project in reaching almost 50 percent contraceptive prevalence in a poor rural area of Bangladesh in just eight years is replicable in the government program. (See: J. F. Phillips et al., "Determinants of Reproductive Change in a Traditional Society: Evidence from Matlab, Bangladesh," *Studies in Family Planning*, 19:313, 1988.) The answer is unlikely to be positive. Besides commanding an impressive array of resources, the Matlab project used a carefully designed organizing strategy, fieldworkers whose level of training and dedication cannot be matched in the government program, and supervisory and management staff committed to making the program a success.

Table 5. Alternative assumptions for life expectancy and total fertility in South Asia, by country, according to year

Country	Life expectancy				Total fertility rate	
	1985		2010		1985	2010
	Males	Females	Males	Females		
Bangladesh	50.8	50.1	59.8	60.1	5.5	4.0
India	57.4	56.7	66.4	66.7	4.5	3.5
Nepal	48.3	47.2	57.3	57.2	6.2	4.5
Sri Lanka	52.5	51.3	61.3	61.3	6.5	4.5
Pakistan	68.0	72.5	72.5	77.0	3.0	2.1

A recent review of the fragile data available for three of the countries of South Asia finds evidence of some decline in fertility in Bangladesh, but not in Nepal or Pakistan; a possible rise in fertility in Pakistan could not be ruled out.[15] The review observes that there is considerable ambivalence concerning family planning among the predominantly Islamic populations of Pakistan and Bangladesh, and concludes that even with the acceptance of birth control, women in these countries would still want an average of around four children.

An Alternative Scenario

What might the population of South Asia total over the next two decades under less optimistic, although plausible, assumptions about fertility and mortality? An illustrative projection (not necessarily a "most likely" outcome projection) covering the period 1985–2010 was run for each of the countries of South Asia, with assumptions as shown in Table 5. According to our projection, one-quarter of the decline in fertility and the increase in life expectancy is projected to occur by the midpoint of the period, and the remaining three-quarters in the second half. In other words, only very modest declines in fertility and improvements in life expectancy are assumed over most of the 1990s.

The results indicate that South Asia's population would grow from just over one billion in 1985 to 1.4 billion in 2000 and to almost 1.8 billion in 2010 (Table 6). The projection for the year 2000 is some 100 million greater than that of the World Bank and 27 million greater than that of the UN. Thereafter, the differential widens: By 2010, the respective differences become a staggering 230 million and almost 100 million.

Thus, slower fertility decline than forecast by the UN and the World Bank inevitably means that the population of South Asia will both become much larger and contain within itself the momentum for larger increases as the 21st century progresses. In our projections, the annual growth rates of South Asia are still above two percent after the first decade of the next century.

A continuing feature of these populations, except for Sri Lanka's, is their young age-structures, which give rise to exceptionally high child-dependency burdens. Throughout the period 1985–2010, more than 50 percent of the people in Bangladesh, Nepal and Pakistan will be children and youths below 21 years of age. Moreover, South Asia will have 72 children and elders for every 100 working-age people (aged 15–64) in the year 2000, and 67 per 100 in 2010, which are very high dependency levels.

Socioeconomic Implications

South Asia's population will increase massively over the coming decades whichever of the scenarios discussed occurs. This increase will entail continued high government expenditures to improve levels of education and health.[16] In the sphere of education, the countries of South Asia will continue to compare unfavorably not only with more industrialized countries but with most of East Asia and Southeast Asia. At present, South Asian countries have both lower mean school expenditures per child and fewer teachers per pupil than either of these groups of countries. Their much younger age-structure means that they will continue to have almost twice the proportion of their population in the younger ages, compared with western countries and several East Asian countries. They will require continued high government expenditures to improve levels of education—expenditures that have a high cost in lost opportunities in other areas of potentially productive investment.

T. Paul Schultz has shown that over a wide cross-section of countries, the proportion of a nation's gross domestic product that is devoted to education is not related to the relative size of the school-age population, thus implying that larger school-age cohorts are associated with lower expenditures per pupil.[17] When this finding is placed in a human resource development context, it might appear to conflict with the argument that rapid population growth poses difficult resource issues in relation to educational expenditures. However, the key is educational quality. The expansion of enrollment at a modest cost per head hides a multitude of educational problems facing South Asian countries: ill-equipped schools, low-paid and poorly trained teachers, rote learning and high dropout rates, all making for a repetitive cycle of educational mediocrity. This is in dramatic contrast with what can be achieved by investing a steady share of the government budget in education, as is the case in Thailand, where economic growth is rapid and fertility has declined sharply.[18]

Over the coming two decades, the growth rate of the labor force of South Asia will be at least as high as that of the population. Even if fertility starts to decline rapidly, the initial effect will be on the primary school population, and there will be no short-term slowing in the growth of the labor force. The question is not so much whether the economies of South Asia will be able to generate sufficient employment to cope with the ever-growing working-age population, but what sort of employment it will be, and with what sort of earnings. Even if increases in the gross national product can reach a healthy figure of around five percent per year on a sustained basis, this will barely manage to absorb increments to the labor force of three percent per year, allowing for modest increases in labor productivity.

South Asian countries have access to readily transferable capital-intensive technologies, and despite labor surpluses, much of their investment in recent years has been capital intensive—for example, in the petrochemical and heavy electrical sectors. Industrial employment will be able to absorb only a small part of the growth in labor supply, given its present low share of total employment and the enormous potential for labor shedding in some sectors (such as textiles) as a result of the adoption of new techniques. Government employment is also unlikely to grow rapidly, as efficiency considerations require a reduction in the numbers of redundant clerks and messengers.

The urban informal sector and the agricultural sector will therefore be required to play an important role in employing new entrants to the labor force, thus maintaining a dualistic labor market characterized by very wide differences in earnings. In the case of agriculture, further labor absorption will require either an expansion in the land base or an increase in labor intensity per hectare through increased irrigation, double-cropping and other labor-intensive technology. In practice, the ability of the agricultural sector to employ huge labor increases in food grain production appears limited, and the prospects for significant increases in productivity (and income) per worker in agriculture appear bleak, as long as the numbers seeking work in this sector continue to grow.

These educational and employment problems can be expected to produce undesirable effects, delaying fertility reduction by hindering the movement of women into the paid labor force. Perpetuation of a surplus labor situation, along with the strong cultural and normative objections to an expanded role for women, is hardly conducive to a rapid movement of women into modern-sector employment.

Continued rapid population growth and urbanization can also be expected to interact in ways that will be detrimental to development. Given the huge rural population of South Asia and low urbanization levels, massive urban growth will result from adding only a modest rate of rural outmigration to the natural increase of urban populations.[19] This will be enough to cause great difficulties in the provision of urban infrastructure and even a minimal standard of housing; at present, 30–40 percent of the population of large Indian cities such as Calcutta, Bombay, Delhi, Madras and Ahmadabad are estimated to live in slums or as pavement dwellers.[20] Yet, because these countries have such large and growing rural populations, massive growth of the cities will not result in a very rapid rise in the overall level of urbanization.

Conclusion

In general, continued substantial population growth in South Asia will inhibit the shift toward an urban-industrial economy by generating increases in the labor force too rapid to be absorbed into modern-sector employment, therefore requiring further "piling up" of a large proportion of new job seekers in agriculture and in the informal sector.

Meanwhile, the high-technology niches, as modern as any in the world but absorbing relatively little labor, will continue to expand in countries such as India and Pakistan. Although they will undoubtedly generate some further employment opportunities, many of these developments are of an enclave character, and will serve to heighten prevailing stark income disparities.[21] These disparities are not only interpersonal and interclass, but interregional, and their exacerbation is likely to heighten ethnic and communal differences and lead to political tensions.

In painting this relatively bleak scenario, we are aware that 20 years ago, pessimists might have predicted continued rapid population growth and slow economic growth in countries such as Thailand and Indonesia, but these countries have instead undergone remarkable transformations. Even so, the preconditions were arguably different, in terms of factors such as the scope for settlement of new lands, the ability of the government to impose its will at the village level, the strength of entrepreneurial groups and, perhaps most important, the relative autonomy of women. We acknowledge that our pessimistic scenario is no more than a foil to the more optimistic UN and World Bank scenarios, and we would be delighted if it were proved wrong. However, such a scenario is sufficiently plausible to be taken more seriously than it has been up to this time by international organizations preparing population projections.

Table 6. Alternative population projections for South Asia, by country and year

Country	1985 (base)	2000	2010
South Asia	**1,007**	**1,426**	**1,764**
Bangladesh	101	150	192
India	769	1,066	1,300
Nepal	17	25	32
Pakistan	103	164	216
Sri Lanka	16	21	24

Source: Projections computed by the authors, based on assumptions in Table 5.

Policy will need to move in concerted fashion on a number of fronts in South Asia if rates of population growth are to be brought close to a balance between low fertility and low mortality within the next few decades. Unfortunately, the less perseverance shown now in tackling the underlying social and institutional obstacles to rapid fertility decline, the more likely it is that more draconian population policies will eventually be contemplated.

References

1. K. Hill, H. Zlotnik and J. Durch, *Procedures for Reducing the Effects of Age Errors on Indirect Demographic Estimation Techniques*, Laboratories for Population Statistics, Scientific Report Series No. 35, Chapel Hill, N.C., 1982.

2. P. Demeny, "A Perspective on Long-Term Population Growth," *Population and Development Review*, **10**:103, 1984.

3. United Nations (UN), *Model Life Tables for Developing Countries*, Population Studies No. 77, New York, 1982; and A. Coale and P. Demeny, *Regional Model Life Tables and Stable Populations*, 2nd ed., Academic Press, New York, 1983.

4. UN, *World Population Prospects 1988*, Population Studies No. 106, New York, 1989.

5. M. T. Vu, *World Population Projections 1984: Short- and Long-Term Estimates by Age and Sex with Related Demographic Statistics*, The World Bank, Washington, D.C., 1984.

6. Y. C. Yu, "The Use of the United Nations Computer Programme for Population Projections," in UN Department of Technical Cooperation for Development, *Population Projections: Problems and Solutions*, New York, 1981.

7. M. Cain, "Perspectives on Family and Fertility in Developing Countries," *Population Studies*, **36**:159, 1982; T. Dyson and M. Moore, "On Kinship Structure, Female Autonomy and Demographic Behaviour in India," *Population and Development Review*, **9**:35, 1983; W. B. Arthur and G. McNicoll, "An Analytical Survey of Population and Development in Bangladesh," *Population and Development Review*, **4**:23, 1978; J. C. Caldwell, *Theory of Fertility Decline*, Academic Press, New York, 1982; and Economic and Social Council on Asia and the Pacific, Population Division, "Female Autonomy and Fertility: An Overview of the Situation in South Asia," *Asia-Pacific Population Journal*, Vol. 2, No. 4, 1987, p. 43.

8. J. C. Cleland and C. Wilson, "Demand Theories of Fertility Transition: An Iconoclastic View," *Population Studies*, **41**:5, 1987.

9. W. C. Robinson, M. A. Shah and N. M. Shah, "The Family Planning Program in Pakistan: What Went Wrong?" *International Family Planning Perspectives*, **7**:85, 1981; Z. A. Sathar, "Pakistan's Fertility Control Policy," in K. Mahadevan, ed., *Fertility Policies of Asian Countries*, Sage Publications, New Delhi, 1989; B. E. Khuda, "Population Control in Bangladesh: The Prospects," in G. W. Jones, ed., *Demographic Transition in Asia*, Maruzan Asia, Singapore, 1984; and D. Banerji, "Population Policies and Programmes in India During the Last Ten Years," and P.S. Bhatia, "India's Family Planning Programme: Emerging Issues," in S. N. Singh et al., eds., *Population Transition in India*, Vol. 1, B.R. Publishing Corp., Delhi, 1989.

10. T. H. Hull, "Fertility Decline in Indonesia: An Institutionalist Interpretation," *International Family Planning Perspectives*, **13**:90, 1987.

11. S. K. Alok, "Family Planning in India: Policies, Goals and Programmes," paper presented at the Registrar General of India/East-West Population Institute South Asia Population Conference, New Delhi, Mar. 14–20, 1989.

12. R. Leete, "Dual Fertility Trends in Malaysia's Multiethnic Society," *International Family Planning Perspectives*, **15**:58, 1989.

13. M. Gendell, "Stalls in the Fertility Decline in Costa Rica, Korea and Sri Lanka," World Bank Staff Working Papers No. 693, Washington, D.C., 1985.

14. G. D. Ness and H. Ando, *The Land is Shrinking: Population Planning in Asia*, Johns Hopkins University Press, Baltimore, Md., 1984.

15. J. C. Cleland and H. I. Shah, "High Fertility in Bangladesh, Nepal, and Pakistan: Motives vs. Means," paper presented at the International Union for the Scientific Study of Population seminar on Fertility Transition in Asia: Diversity and Change, Bangkok, Thailand, Mar. 1988.

16. World Bank, *World Development Report 1984*, Part II, Oxford University Press, Oxford, 1984.

17. T. P. Schultz, "School Expenditures and Enrollments, 1960–1980: The Effect of Income, Prices and Population Growth," Discussion Paper No. 487, Economic Growth Center, Yale University, New Haven, 1985.

18. G. W. Jones, "Population Dynamics and Educational and Health Planning," background paper for Training in Population, Human Resources and Development Planning, International Labor Office, Geneva, 1990.

19. R. Mohan, "Urbanization in India's Future," *Population and Development Review*, **11**:619, 1985.

20. S. L. Kayastha, "Sustainability of Metropolitan Centres in Third World Countries," in S.N. Singh et al., 1989, op. cit. (see reference 9).

21. G. Rogers, ed., *Population Growth and Poverty in Rural South Asia*, Sage Publications, New Delhi, 1989.

Books in Review

The Population Wars

Nature Against Us: The United States And the World Population Crisis, 1965–1980

by Peter J. Donaldson, The University of North Carolina, Chapel Hill, 1990, $29.95, 207 pp.

Reviewed by Rodolfo A. Bulatao

Peter J. Donaldson tells the story of how the U.S. Agency for International Development (AID) became a missionary for family planning around the world and considers what difference the agency has made. His story has no real villains, because Donaldson appears sympathetic to both the proselytizers and the proselytized, as well as to both the Washington bureaucrats seeking to expand their reach in the service of a greater good and the local government officials saving face by turning aside foreign diktats. But the tale does appear to have a hero, albeit a tragic one.

The story is a great dialectic, involving two opposing ideas: that population growth can and will take care of itself; and that the world can be saved by widespread contraceptive use. Donaldson weaves these concepts through a discussion of American ideology, bureaucratic development, world reaction to the American impetus and the results of AID's activities. To those on one side, the population crisis required going to war, with no hostages taken, no holds barred and American population officers in the vanguard of a worldwide coalition. To those on the other, development had to be given time to work; patient diplomacy respectful of local prerogatives and village cultures was the only approach that held out any hope of ultimate success.

Donaldson sets the stage by discussing the conservative Catholic opposition to contraception, a force that might have been expected to impede an American initiative in this area. He questions not why Catholics opposed "unnatural" contraception but why they did not oppose it more strongly. His answer lies in the popular acceptance among Catholics of John Courtney Murray's theory of civic culture in which different faiths coexist by respecting each other's beliefs.

But why, then, did American culture adopt an aggressive population policy? The susceptibility was rooted in "our national self-confidence" [p. 19] in the ability to control one's environment, the thinking that almost all problems around the world are merely technical or administrative. The goad was concern about strategic American interests threatened by rapid population growth. Thus, population control was a sacred crusade to bring contraceptives to the masses, but it also shared of the snobbery of the privileged. Unfortunately, this part of the story is somewhat obscured by the author's moving back and forth over time, selecting appropriate quotes. (He is sometimes vague on chronology.)

Next, Donaldson explains how population growth was transformed from the "preoccupation of a band of enthusiasts" [p. 31] to an extensive federal bureaucracy with mutually supportive links among universities and nonprofit organizations. He begins with the birth of AID in 1961 and traces the evolution of the population program from the $2 million it provided in international population assistance in 1965 to the $185 million it provided by 1980.

The story has elements of Greek tragedy. The concern of the population crusaders seems to have been, from the first, to find and rally around "a zealot of the sort the population control lobby would find praiseworthy" [p. 36]. The early AID effort, in contrast with their desires, was "never overwhelming in its enthusiasm" [p. 39]. By the late to mid-1960s, world food shortages and other critical events had put population control high on the agenda for development aid, and advisory committee reports and even presidential statements had acknowledged its importance. Nevertheless, "supporters of a more interventionist role for the U.S. government remained disappointed by the limited concern that the problem of rapid population growth caused among senior AID officials" [p. 41]. Donaldson consistently describes official statements and activities throughout this period as cautious.

The population crusaders got their wish when Reimert Ravenholt took over and built up the population effort. With strong convictions, a talent for promoting programs and no inclination to be reasonable, Ravenholt singlemindedly turned AID into the leading supplier of contraceptives in the developing world. Ravenholt is the only person Donaldson profiles in the book. Although the contributions of other players as varied as William H. Draper, Jr., Frank Notestein, John D. Rockefeller 3d, David Bell, Philander Claxton and Bernard Berelson are mentioned—their memos apparently scrutinized and their most relevant quotes extracted—Donaldson does not attempt to bring them to life. In contrast, we are told about Ravenholt's Dutch ancestry, his early career in public health and medical school, his edge of wildness and his capacity for physical intimidation (the author describes one incident where Ravenholt burst into a population official's office "screaming at very close range and . . . flailing [his] arms" [p. 101]).

We are also told of Ravenholt's substantial accomplishments as seen by many who were there. His dictum was "'ordering contraceptives is like ordering bullets for a war. You don't want to run out'" [p. 106]. He followed this rule doggedly and to excess, ruffling sensitivities and accumulating critics and enemies. The endgame began in 1977 with one of those reorganizations that run like earthquakes through public bureaucracies. Ravenholt's program was being sliced into pieces for the regional AID bureaus, and within a few years he was pushed, kicking and screaming to the end, out of the agency.

Donaldson goes on to describe world reaction to the U.S. population program, particularly at the world population conferences in 1974 and 1984. These conferences featured ideological battles and striking reversals of position by both the United States and a large group of developing countries. However, lacking a focus on a central figure, this story does not come as vividly to life as the earlier bureaucratic battles. There is more to say about actors and actions in the population field outside the United States, but this is not the book in which to find such descriptions.

In reflecting on what good the American population program did, Donaldson takes a detour. He first recounts the Population Council's role in the Korean family planning program, giving pieces of the broad picture. However, his focus is heavily on Korea's initial problems in procuring materials for the manufacture of IUDs and on the American role in finding the money. (This is an interesting echo of his discussion of Ravenholt's predominant focus on providing commodities.) The Korean episode is supplemented by a short analysis that suggests that greater foreign aid is associated with better family planning programs and by a review of the scientific arguments on whether fertility responds to family planning or to socioeconomic development.

(Continued on page 120)

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DIGEST

Most Zimbabwean Men Approve of Family Planning, But Believe It Should Wait Until After the First Birth

Married men in Zimbabwe are likely to know about contraceptives, to have used them at some time and to approve of their use, according to a recent survey.[1] Yet most believe that a woman should not use family planning until after the birth of her first child, and that men should make the primary decision about whether a couple should use a contraceptive method. Over half of the sample felt that it was the woman's responsibility to obtain both family planning information and methods. Most respondents said they used family planning for spacing births rather than limiting them.

Data for the study came from the Zimbabwe Male Fertility Survey (ZMFS), conducted in 1988. A total of 711 respondents from 11 representative regions—four communal farming areas, three commercial farming areas and four urban areas—were interviewed. Respondents' mean age was 38 years; 52 percent were aged 20–24, 28 percent were aged 35–39 and 21 percent were older than 50. Twenty-four percent of respondents—mostly older men—did not know their wife's age; for the 531 couples for which the wife's age was known, the respondents' mean age was 35 and that of their wives was 28. Most respondents had had six years of education; most of their wives had had five. Twelve percent of respondents and 15 percent of their wives had had no formal education. Fifty-six percent of men worked in agriculture, 13 percent were in blue-collar occupations, eight percent were in professional, technical or managerial positions, six percent were in clerical jobs, nine percent worked in the service sector and seven percent had other types of jobs. (Very small percentages reported being retired or unemployed.) The mean number of children among the respondents was 4.0; 30 percent had 1–2 living children, 30 percent had 3–5, 30 percent had more than five and 10 percent had no living children.

Unprompted, nearly 79 percent of the men knew of at least one contraceptive method. The pill was the most frequently mentioned method (75 percent), followed by the condom (38 percent) and injectable contraceptives (20 percent). When prompted and unprompted responses were combined, about 98 percent of the respondents knew of at least one method. The least-known methods were vaginal foam, male sterilization and the diaphragm. Ever-use of a contraceptive method was reported by 80 percent of the sample. Men who had used a method were more likely to be older (85 percent of those 40 or older, compared with 79 percent of those younger than 40); they were also more educated (91 percent of those with some secondary or higher education vs. 77 percent of those with an elementary school education or less) and were more likely to live in urban areas rather than rural (88 percent vs. 78 percent).

Fifty-three percent of the sample (and 66 percent of those who had ever used family planning) said that their main reason for using a contraceptive method was to space births; only 12 percent of the sample (and 15 percent of those who had ever used a method) did so to limit births. Seven percent said they were using a method for both of these reasons. Six percent were doing so for economic reasons; two percent did not specify a reason, and less than one percent said they used a method to protect their wife's health.

Among those who had ever used family planning, 59 percent said that in a relationship, men should have the "major say" in deciding whether to use a contraceptive method. Forty-eight percent of ever-users said they alone made the decision to practice family planning, and 54 percent said they alone decided how many children to have. (Overall, 78 percent of all respondents—either alone or with their wives—were involved in the decision to use a contraceptive method.)

Sixty-two percent of ever-users and 60 percent of the total sample said that it is the woman's responsibility to obtain information on family planning; moreover, 63 percent of ever-users' wives and 50 percent of the general sample wives obtained the methods. Wives also obtained supply methods 78 percent of the time—reflecting a high reliance on the pill, which constitutes 90 percent of modern contraceptive use among couples.

Slightly more respondents said they approved of using contraceptive methods than actually used them (84 percent vs. 80 percent). Seventeen percent said they either did not approve of contraceptive methods or could not decide if they did. Urban men were more likely than rural men to approve of family planning (91 percent vs. 80 percent); men with some secondary or higher education were more likely to approve than were men with an elementary education or less (93 percent vs. 80 percent).

Among those who said they approved of family planning, 62 percent said that a woman should not use it until after the birth of her first child. Twenty-two percent said it should not be used until after a second or a later birth, while less than 20 percent said a woman should use family planning before her first birth. In other words, more than four in five respondents who generally approved of the use of contraceptive methods nevertheless believed that they should not be used until a woman had had at least one child. Seventy percent of men younger than 40 said a woman should use family planning before her first birth, compared with only 30 percent of men older than 40.

Fifty-seven percent of the total sample said they had talked with their wives about family planning at least once in the past year, including 71 percent of respondents whose wives were under 45 years old. Men with some secondary education or more and urban men communicated with their wives to a greater extent (81 percent and 74 percent, respectively) than did men with an elementary education and rural men (48 percent and 50 percent, respectively).

The men who were surveyed gave a mean ideal family size of 4.6 children. Mean ideal family size was significantly smaller among urban respondents than among their rural counterparts (3.9 vs. 5.0 children). Among rural residents, respondents from communal farming areas wanted more children (5.3) than did those from commercial farming areas (4.6). There were no significant differences in ideal family size by age of respondent; this further supports the finding that spacing is the main reason for contraceptive use among the sample.

Use of contraceptive methods is relatively high in Zimbabwe: Other research has shown that 43 percent of women in Zimbabwe practice contraception, with 36 percent using modern methods and seven using traditional methods. Yet fertility remains high, with the total fertility rate at 5.7 lifetime births per woman.[2] In addition, the mean ideal family size reported in the survey was smaller than the nation's fertility rate. The researchers note that these findings might indicate a substantial unmet need for family planning, but might also indicate that those who say they want no more children nevertheless fail to practice contraception. It may be that husbands want more children, and exert greater control over the reproductive process. The researchers suggest that some men may assume that not all of their children will survive, and may therefore aim to exceed their desired family size.—*R. Turner*

References

1. M. T. Mbizvo and D. J. Adamchak, "Family Planning Knowledge, Attitudes, and Practices of Men in Zimbabwe," *Studies in Family Planning*, **22**:31, 1991.

2. Central Statistical Office, Government of Zimbabwe, and Institute for Resource Development/Macro Systems, Inc., *Zimbabwe Demographic and Health Survey, 1988*, Harare, Zimbabwe, and Columbia, Md., 1989.

Thai Children from Small Families Generally Attain More Education than Those from Large Families

In Thailand, family size has a substantial effect on children's educational attainment: Children who have no siblings are almost twice as likely to attend secondary school as children with six or more siblings. This relationship is particularly strong among middle-income and high-income rural residents. Few low-income rural residents seem to have the means to send their children to secondary school, even if they have small families.[1]

In the Thai educational system, there are three levels of preuniversity education—primary (which is compulsory), lower secondary and upper secondary. Parents are responsible for the costs of educating their children. Using data from the 1987 Thailand Demographic Health Survey (TDHS), researchers examined the relationship between family size and children's educational attainment in Thailand. Since most children finish primary school, the researchers looked only at the proportions of children entering lower and upper secondary schools.

In the 1987 TDHS, 6,775 ever-married women aged 15–49 had been sampled. The study analyzed information that the women provided about children aged six and over who were from Thai-speaking families and from families in which both parents were present. The analysis was further restricted to children who were age 12 or older when it focused on entrance into lower secondary school and to children age 15 or older when it focused on entrance into upper secondary school. The investigators used three measures of educational attainment: the proportion of all eligible children (N=6,256) entering lower secondary school; the proportion of all eligible children (N=4,537) entering upper secondary school; and the proportion of all eligible children who had attended lower secondary school (N=1,913) who went on to upper secondary school.

Before they estimated the relationship between family size and education, the researchers wanted to determine whether Thai couples were consciously and successfully choosing their family size based on their educational desires for their children. They were able to answer this question in two ways. First, they found little to no correlation between family size and the value that the mother placed on having more than a lower secondary education. Second, despite a high level of contraceptive use among women with more than one child, actual family sizes were often higher than fertility preferences, particularly among women with five or more children. Thus, even if many couples did want to restrict family size to increase their children's educational attainment, family size control was imperfect.

A univariate analysis showed that child's age and sex, parent's education, socioeconomic status, father's work, mother's opinion about secondary education, urban residence and school accessibility in rural areas all had some effect on family size. Therefore, the researchers used a logistic regression analysis to control for these factors when measuring the effect of family size on children's education.

Table 1 Adjusted percentages of children entering lower and upper secondary school, Thailand, 1987 DHS

No. of living children	% entering lower	% entering upper	
		All children	Lower entrants
	(N=6,256)	(N=4,537)	(N=1,913)
Total	**38**	**28**	**78**
1	54	39	77
2	50	37	81
3	41	30	78
4	42	33	80
5	34	27	79
6	33	23	75
≥7	29	20	72

The adjusted proportion of children overall who entered lower secondary school was 38 percent (Table 1). There was a clear negative association between family size and the likelihood of entering lower secondary school: Fifty-four percent of only children entered lower secondary school, while just 29 percent of children from families with at least seven children did so.

Twenty-eight percent of all the children entered upper secondary school. The association between family size and the likelihood of starting upper secondary school was also clear: While 39 percent of only children went on to upper secondary school, just 20 percent of those who were one of at least seven children did so. Thus, the probability of going beyond primary school was almost half that for children from the largest families than for those from the smallest.

There was a weak correlation between family size and entry into upper secondary school when only those who entered lower secondary school were considered. The authors suggest that this was because "a greater proportion of children from large families have left the educational system by the end of the primary grades, [and] those from large families who enter secondary schools are more selective than children from smaller families."

The researchers also sought to determine the effects of urban vs. rural residence and household wealth on the relationship between family size and education. They divided the wealth category into low, middle and high for rural residents and into lower and higher for urban residents. The analysis of the probability of entering upper secondary school was conducted only for all eligible children, since family size had already been shown to have a weak effect when analyses were restricted to those who had entered lower secondary school.

Among the poorest rural families, the relationship between family size and entry into lower secondary school was minimal, and family size and the likelihood of entering upper secondary school were unrelated. According to the authors, poor families with even one or two children most likely do not have the means to send their children beyond primary school. However, among middle-income and high-income rural residents, the effect was much stronger: Fifty percent of only children from middle-income households and 65 percent of those from high-income households entered lower secondary schools, compared with 20 percent and 32 percent, respectively, of children from families with seven or more children. The relationship was also much stronger for entry into upper secondary school: Thirty-nine percent of children from the smallest middle-income families and 44 percent of children from the smallest high-income families went to upper secondary school; in contrast, 11 percent and 24 percent, respectively, of children from the largest middle-income and high-income families entered upper secondary school.

In urban areas, most children entered lower secondary school. Among urban families, the relationship between family size and entry into lower secondary school was fairly weak, particularly for higher income households. The authors point out that this is "probably attributable to the generally higher levels of wealth characterizing urban households, the general availability of schools, and the lower opportunity costs involved in comparison with the situation for rural children."

Among urban residents, the effect of family size on entry into upper secondary school was somewhat greater: The proportion of only children from lower income households who entered upper secondary school was 59 percent, while the comparable proportion among children who were one of at least seven children was 37 percent. Among higher income families, 86 percent of children with no siblings and 70 percent of children with at least six siblings entered upper secondary school.

The researchers believe that their findings are supported by the fact that in Thailand, parents are responsible for all childrearing costs. They conclude that "the dilution hypothesis, whereby lesser material resources are available per child, is a plausible mechanism by which family size becomes an important determinant of the schooling that parents provide for their children." They also point out that the current fertility decline in Thailand—evidenced by comparisons of data from the 1980 census and the 1987 TDHS—is likely to have a substantial impact on the proportion of Thai children who attend lower and upper secondary school.—*P. Rind*

Reference

1. J. Knodel and M. Wongsith, "Family Size and Children's Education in Thailand: Evidence from a National Sample," *Demography*, **28**:119, 1991.

Paraguay Survey Shows Moderately High Fertility And Low Child Mortality

Fertility in Paraguay is moderately high, with women having nearly five children over their lifetime, one more child than they consider to be ideal. The fertility levels and desires among Paraguayan women have changed very little in recent years. Nearly half of those in union currently use a method of family planning, with just over one-third using a modern method. Moreover, in the Latin American context, infant and child mortality levels in Paraguay are relatively low, and fully 90 percent of women received some kind of prenatal care. These are a few of the highlights of the 1990 Paraguay Encuesta Nacional de Demografía y Salud (ENDS), which surveyed 5,827 women aged 15–49 between May and August of 1990.[1]

Paraguay is near the center of the South American continent, between Brazil, Bolivia and Argentina. Its Occidental zone, also known as Chaco, covers nearly 60 percent of the country; this region is very sparsely populated and was not surveyed by the 1990 ENDS. The territory included in the survey—the more densely populated Oriental zone—consists of four regions: the capital and surrounding metropolitan areas of Asunción, the North, the Central South and the East. Roughly half of the Paraguayan population is bilingual (speaking both Spanish and the indigenous language of Guaraní), while 40 percent speak Guaraní only and seven percent Spanish only. (The ENDS questionnaire was administered in Spanish and translated for respondents who spoke only Guaraní.)

The characteristics of the sample confirm that advances in education have taken place: Forty-one percent of the youngest women (aged 15–19) have completed secondary school, compared with just 13 percent of the oldest women (aged 44–49). Gains in higher education are strongest in urban areas, where women are more than three times as likely to have completed secondary school as are their rural counterparts (43 percent vs. 13 percent).

Marriage and Fertility

At the time of the survey, 33 percent of the sample of women aged 15–49 were single and 61 percent were in a union (47 percent in legal unions and 14 percent in consensual unions); the remaining six percent were either separated, widowed or divorced. As Table 1 shows, the median age at first marriage is 21 years, and has remained virtually unchanged in Paraguay over the past two decades. The median age at marriage among urban women is two years greater than that among rural women, a difference that has also been long-standing. While the data indicate that women have their first sexual experience, on average, two years before marriage, the age at first intercourse tends to be lower among the younger cohorts (e.g., 20 among women aged 30 or more and 19 among women under age 30). Moreover, differences in educational attainment and place of residence contribute to this trend, since younger, less educated women usually begin sexual activity the earliest and more educated women living in metropolitan Asunción begin the latest.

Women begin childbearing at a relatively young age in Paraguay. One-third of the sample had their first child before age 20, and one-half before age 22. Among women aged 25–49, the median age at first birth (22 years), applies across all age-groups, and thus has not changed much over time. However, the median age at which women start childbearing varies according to urban or

Table 1. Selected findings from the 1990 Paraguay Encuesta Nacional de Demografia y Salud

Measure	Median, rate or avg.
Median age at marriage (in yrs.)*	20.9
Median age at first intercourse (in yrs.)*	19.3
Median age at first birth (in yrs.)*	21.7
TFR (lifetime births per woman)	4.7
No. of children considered ideal	3.9
% of married women currently using any contraceptive method	48.4
% of married women currently using a modern method	35.2
% of married women with unmet need for family planning	20.0

*Based on women aged 25–49

DIGEST

rural residence (22 years vs. 20 years), region (23 years in Asunción, compared with 21 years in the other three regions) and educational level (24 years for the most educated women, 21 years for women who have completed primary school and 18 years for the least educated women).

The total fertility rate (TFR) is 4.7 lifetime births per woman, which places Paraguay among the higher fertility countries in Latin America (where the regional average is currently 3.7 births per woman). The TFR has remained essentially unchanged since the 1979 Encuesta Nacional de Fecundidad (ENF). However, age-specific fertility rates in each age-group were lower five years before the 1990 survey than 10 years before, suggesting the beginning of a fertility decline.

Fertility differentials are especially pronounced by area of residence and education: Rural women have 2.5 more children than urban women, and women with only 0–2 years of schooling have 3.5 more children than those with secondary schooling or more. The TFRs also vary greatly by region, with women in the capital city of Asunción having the fewest lifetime births (3.5) and women in the North having the most (6.7).

Paraguayan women, on average, consider the ideal number of children to be four. This measure is highest (six children) among the oldest women with the least education; their ideal family size is twice as large as that mentioned by women aged 15–24 in all education subgroups.

Seventy-three percent of births occurring in the last five years to women in the sample were planned, 16 percent were mistimed and just seven percent were unwanted. If women in Paraguay were to have only those children that they intended to have, the TFR of 4.7 would be reduced by 25 percent, yielding a total wanted fertility rate of 3.5 children.

Contraceptive Knowledge and Use

Knowledge of a contraceptive method is nearly universal. Among women in union, the two most widely known modern methods are the pill (94 percent) and injectables (89 percent); the two least commonly known are barrier methods (46 percent) and vasectomy (17 percent). Moreover, roughly similar proportions (85 and 86 percent) are familiar with the IUD and with the traditional folk method of *yuyos* (native herbs), which have no proven contraceptive effect.

Although 43 percent of Paraguayan women in union have ever used a traditional method, 58 percent have tried a modern method. Overall, the method that most women have ever used was the pill (40 percent of women in union), and the second most popular method was *yuyos* (25 percent).

At the time of the survey, 48 percent of married women were using contraceptives—35 percent a modern method and 13 percent a traditional method. The pill is by far the most popular method, currently used by 14 percent of women in union. Female sterilization (seven percent), the IUD (six percent) and injectables (five percent) were the next most commonly used methods. Three percent of married users relied on rhythm; a slightly higher proportion (four percent) said they were using *yuyos* at the time of the survey. The proportion of women sterilized almost doubled in the short interval between the 1987 Encuesta de Planificación Familiar and the 1990 ENDS. Moreover, the median age at which women decide to be sterilized seems to have increased recently: Among women who were sterilized in the two years before the survey, the median age was 32 years, compared with 29 years among women who underwent the operation five or more years before the survey.

Modern method use varies by area and region of residence, educational level and parity. For example, use of modern methods is most common among urban women, those living in Asunción, those who have completed primary school and those who have three children. While there is comparatively little variation in pill use among subgroups of women, reliance on the IUD varies greatly: It is highest in Asunción (11 percent, compared with three percent in each of the other regions) and among the most educated (11 percent, compared with two percent among the least educated). Use of female sterilization, which increases with age and parity, varies little by urban or rural residence but greatly by region (i.e., 10 percent in the East vs. three percent in the North).

The data indicate that Paraguayan women are starting to use contraceptives earlier: Nearly half of 20–24-year-old users started use before they had their first child, compared with just 13 percent of those aged 45–49.

The private sector is the major provider of contraceptives in Paraguay, supplying 70 percent of modern methods, and several methods are predominantly distributed in pharmacies. Roughly four-fifths of women who use condoms and injectables and nearly three-quarters of pill users rely on pharmacists for their method.

According to the 1990 ENDS, the median duration of postpartum amenorrhea is five months, and postpartum abstinence lasts for two months; thus, the total period of postpartum infecundability is roughly five months. It is longest among women who are most likely to breastfeed for prolonged periods—those living in the North and in rural areas and those with the least education.

Nearly 40 percent of women in union who do not practice contraception have no intention of doing so in the future. Among those under age 30, the principal reasons for nonuse are not liking contraception (24 percent), not being sexually active (22 percent) and wanting to become pregnant (21 percent). Nonusers who do plan to try a method in the future are most inclined to use the pill.

Thirty-six percent of women in union want no more children, and thus have a potential demand for methods to limit childbearing; 26 percent want children sometime in the future and can be said to have a demand for spacing. Thus, 62 percent of Paraguayan women are potentially in need of family planning. The desire for limiting future births is fairly uniform across regions and urban or rural residence, but rises consistently with parity among all subgroups. Moreover, this proportion varies substantially by education, with the least educated women (who tend to have more children) most likely to say they want no more children. The desire to space births is highest among the youngest women (57 percent of 15–19-year-olds).

Twenty percent of Paraguayan women of reproductive age have an unmet need for family planning; that is, they are fecund, sexually active and not using a method, did not want their current or most recent pregnancy and also do not want another child for at least two years. This total breaks down to 12 percent who want to limit births and eight percent who want to space them.

Maternal and Child Health

According to the 1990 ENDS, the infant mortality rate in Paraguay is 34 deaths per 1,000 live-born infants and the child mortality rate is 43 per 1,000 children under age five. These rates are the lowest among the Latin American nations that have participated in the Demographic and Health Surveys program to date.* The authors suggest that some underestimation may have occurred, and a comparison with mortality data from the 1979 ENF for the same years revealed that the 1990 ENDS estimates were 22 percent lower. Nevertheless, the 1990 data point to real declines in infant mortality in Paraguay, since levels decreased by nearly one-quarter from 1975–1980 to 1985–1990.

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*Bolivia, Brazil, Colombia, the Dominican Republic, Ecuador, El Salvador, Guatemala, Paraguay, Peru and Mexico.

Infant mortality differentials vary most by region of residence, education and receipt of prenatal and delivery care. For example, infants born to the least educated women are twice as likely to die in their first year as those born to the most educated women (45 per 1,000 vs. 23 per 1,000). In addition, the infant mortality rate among infants born to women who have no prenatal care or medical attention during delivery is nearly double that among women who have both (50 per 1,000 vs. 27 per 1,000).

Overall, 91 percent of women who gave birth in the past five years received some prenatal care (59 percent from a doctor, 25 percent from a nurse-midwife and seven percent from a traditional birth attendant). Furthermore, the vast majority of mothers (84 percent) received at least one dose of the tetanus toxoid vaccine. While 53 percent of Paraguayan women delivered their most recent baby in a health facility, 46 percent delivered at home.

Consistent with the relatively low infant and child mortality rates, from 57 percent to 87 percent of Paraguayan toddlers have received at least one vaccination for tuberculosis (BCG), measles, polio, and diptheria-pertussis-tetanus (DPT), and one-third have complete vaccination coverage. Furthermore, only eight percent of children under five had diarrhea in the two weeks before the survey; of these, over half (52 percent) were taken to a medical facility.—*L. Remez*

Reference

1. República del Paraguay, *Encuesta Nacional de Demografía y Salud, 1990,* Centro Paraguayo de Estudios de Población and Institute for Resource Development/Macro Systems, Inc., Columbia, Md., 1991.

Early Marriage and Childbearing Remain Common In Much of Developing World, Even as Fertility Falls

Fertility has declined in recent years in most countries in the developing world, although it generally remains well above replacement level and intercountry variation is substantial. According to an analysis of Demographic and Health Survey (DHS) data from 25 countries in Africa, Asia, Latin America and the Caribbean, at current rates of childbearing, Thai women can expect to have about 2.3 children by the end of their reproductive years, while Ugandan women can expect to have about 7.2 children.[1] Teenage childbearing is still common, particularly in Sub-Saharan Africa, where the fertility rate for 15–19-year-olds in nine of the 10 countries ranges from 103 to 209 live births per 1,000 women; outside of Sub-Saharan Africa, fertility rates for that age-group exceed 100 live births per 1,000 only in the Dominican Republic and Guatemala.

Fertility Trends

The surveys found wide variations in fertility among regions. The highest levels were in Sub-Saharan Africa, where at current rates of childbearing, women in eight of the 10 countries surveyed can expect to have more than six children by the end of their reproductive lifetime. The three Asian countries had the lowest fertility, with 2–4 lifetime births per woman. Intermediate levels were found in North Africa, where the average woman will have 4–5 children, and in Latin America and the Caribbean, where women in every country except Guatemala can expect to have fewer than five children.

Table 1 shows the total fertility rate (TFR) for women aged 15–44 in each of 25 developing countries for the periods 4–7 years and 0–3 years before their respective surveys, and the magnitude and direction of change between the two periods. Fertility decreased in all countries except Uganda, which recorded an increase of one percent. Of the other 24 countries, 13 registered a fertility decrease of 15 percent or more; in five of those countries, fertility dropped by more than 20 percent.

In the nine Sub-Saharan African countries where fertility decreased, the decline ranged from less than six percent in Liberia and Ghana to almost 19 percent in Zimbabwe. Despite these almost universal declines, Botswana and Zimbabwe were the only two sub-Saharan countries with a TFR of less than six for the period 0–3 years before their surveys. The decreases in the three Asian countries surveyed were relatively large, and only Indonesia had a TFR exceeding three during the period 0–3 years before the survey. In Latin America, the relative decreases in Colombia, Ecuador and Peru were almost twice as large as those in Bolivia and Mexico (21 percent vs. 11 percent). In Trinidad and Tobago, where fertility was already low, the decline was only 2.4 percent.

Table 1. Total fertility rate for women aged 15–44 for the periods 4–7 and 0–3 years prior to the survey, and percentage change between those periods, Demographic and Health Surveys, 1986–1989

Country and year	TFR		
	4–7 yrs. prior to survey	0–3 yrs. prior to survey	% change
Sub-Saharan Africa			
Botswana (1988)	5.56	4.78	–14.0
Burundi (1987)	7.42	6.50	–12.4
Ghana (1988)	6.43	6.06	–5.8
Kenya (1988–1989)	7.09	6.46	–8.9
Liberia (1986)	6.79	6.39	–5.9
Mali (1987)	7.70	6.84	–11.2
Senegal (1986)	7.55	6.37	–15.6
Togo (1988)	7.17	6.22	–13.3
Uganda (1988–1989)	7.11	7.18	+1.0
Zimbabwe (1988–1989)	6.55	5.31	–18.9
North Africa			
Egypt (1988–1989)	4.94	4.58	–7.3
Morocco (1987)	5.63	4.58	–18.7
Tunisia (1988)	5.07	4.26	–16.0
Asia			
Indonesia (1987)	4.32	3.21	–25.7
Sri Lanka (1987)	3.31	2.72	–17.8
Thailand (1987)	2.94	2.25	–23.5
Latin America/Caribbean			
Bolivia (1989)	5.52	4.92	–10.9
Brazil (1986)	4.50	3.63	–19.3
Colombia (1986)	4.04	3.20	–20.8
Dom. Rep. (1986)	4.55	3.69	–18.9
Ecuador (1987)	5.16	4.08	–20.9
Guatemala (1987)	6.53	5.55	–15.0
Mexico (1987)	4.52	4.01	–11.3
Peru (1986)	5.28	4.20	–20.5
Trinidad and Tobago (1987)	3.39	3.12	–2.4

The large decreases in the TFR in Burundi, Mali, Senegal and Togo were unexpected, since fewer than four percent of married women in those countries use modern methods of contraception. The investigators found no consistent decline in cohort fertility and little change in any of these countries (except Senegal) in determinants of fertility such as age at first birth or age at first marriage; however, they did find indications of considerable misreporting of birth dates. In light of this evidence, the investigators concluded that "the declines recorded in the DHS surveys in these countries are most likely the result of both period changes in fertility rates and data errors."

Between the periods 4–7 years and 0–3 years before the survey, fertility among 15–19-year-olds fell in all countries except Ghana, where there was a 5.7 percent increase. In Liberia and Mali, the decrease was less than three percent, compared with 39 percent and 43 percent, respectively, in Burundi and Indonesia. In 21 countries (all but Ghana, Liberia, Uganda, and Trinidad and Tobago), age-specific fertility rates decreased across the board, and in three countries—Indonesia, Peru and Zimbabwe—declines of at least 14 percent occurred in every age-group.

During the 15 years preceding the surveys, the fertility of women younger than 35 declined in most of the Latin American and

DIGEST

Caribbean countries included in the analysis.* The decreases in Bolivia, Guatemala, and Trinidad and Tobago between the periods 12–15 and 0–3 years before the survey were relatively small (13–15 percent) in comparison with declines of 24–34 percent in the other countries in those regions. The rate of change seems to have been fairly constant in the Dominican Republic, Ecuador and Mexico, while it has accelerated sharply in recent years in Brazil, Colombia and Peru. Levels of fertility in the three Asian countries fell sharply during that period, with Thailand recording a drop of 46 percent and Indonesia and Sri Lanka experiencing decreases of 39 percent and 28 percent, respectively. In Thailand, the rate of decrease was steady; in Indonesia and Sri Lanka, the greatest part of the decline occurred in the eight years preceding the survey.

In Egypt, Morocco and Tunisia, the decrease in fertility among 15–34-year-olds during the 15 years preceding the surveys occurred at steady rates of 23–35 percent. In Sub-Saharan Africa, however, the picture is much more complex. Three countries—Botswana, Kenya and Zimbabwe—experienced long-term declines of 18–25 percent, and two others—Uganda and Ghana—showed smaller decreases (nine percent and 11 percent, respectively). In each of the other five countries, the TFR for the period 4–7 years before the survey was higher than the rates for the periods immediately before and after it. According to the researchers, "it is possible that a temporary increase in fertility actually occurred, . . . [but] it is more likely that birth displacement is the principal factor. Hence, some caution should be used in evaluating these data."

Completed Fertility

Women aged 45–49 at the time of the respective surveys had borne from a low of 4.9 children in Sri Lanka to a high of 7.8 in Uganda. In Africa, Latin America and the Caribbean, the mean number of children ever born exceeded six in all countries except Botswana (5.7), Bolivia (5.9), Brazil (4.7)† and Trinidad and Tobago (5.0); in Asia, however, Indonesia was the only country in which the number of children ever born was greater than five (5.6).

Although infant and child mortality rates have generally improved in the developing world, they remain high in many countries. The DHS analysis found that at the time of each country's survey, women aged 45–49 had lost between six percent (in Trinidad and Tobago) and 39 percent (in Mali) of their children. Survival rates were lowest in Sub-Saharan Africa: The only three countries in the analysis in which the proportion of children surviving was 70 percent or lower were in that region. In none of the Sub-Saharan countries did more than 90 percent of the children ever born survive. The situation was somewhat better in North Africa, where the proportion surviving was between 76 percent and 82 percent of children ever born to women who were 45–49 at the time of the survey. The proportion of children surviving ranged from 77 percent in Bolivia to 94 percent in Trinidad and Tobago, with the figure in most countries falling between 82 percent and 89 percent.

Age at First Birth

The median age at first birth among women aged 40–44 ranged from 18.3 years in Uganda to 23.1 years in Sri Lanka. In general, women in Sub-Saharan Africa were about two years younger than women in other regions when they had their first child. The median age at first birth was younger than 19 in six of the 10 Sub-Saharan countries, but it was at least 20 years in all but two of the countries in other regions. First births occurred comparatively late in Sri Lanka and Tunisia: At the time of the survey, fewer than one-third of the women aged 20–24 and fewer than two-thirds of those aged 25–29 had given birth to their first child.

For each country, the investigators compared the median age at first birth among women aged 25–29 and among those aged 40–44 at the time of the respective surveys. Trends in the age at which women had their first birth varied markedly by region. Little change occurred in Sub-Saharan Africa during the 20 years preceding each survey: Only in Ghana did age at first birth rise by even one year. In most of Latin America and the Caribbean, median age at first birth remained fairly stable, but it increased by more than six months in Colombia and Peru, and by over a year in the Dominican Republic and Trinidad and Tobago. In North Africa, the median age at first birth rose by about 1.7 years in Egypt, by 2.3 years in Morocco and by 3.0 years in Tunisia. In Asia, the smallest increase in the median age at first birth—half a year—was in Indonesia; in Thailand and Sri Lanka, the median rose by 1.1 years and 1.6 years, respectively.

As these figures indicate, childbearing still begins early in much of the developing world. The proportion of women who have their first child during their teenage years is particularly high in Sub-Saharan Africa, where 54–69 percent of the women aged 20–49 in every country except Burundi had given birth before age 20. In Latin America and the Caribbean, about one-third of the women were teenagers when they had their first birth. In Tunisia, Sri Lanka and Thailand, the proportion of women who started childbearing that early was much smaller (20–27 percent), while in Burundi, Egypt and Morocco, the proportion (35–41 percent) was similar to the Latin American average.—*F. Althaus*

Reference

1. F. Arnold and A. Blanc, *Fertility Levels and Trends*, DHS Comparative Studies, No. 2, Institute for Resource Development/Macro Systems, Inc., Columbia, Md., 1990.

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*The investigators limited this analysis to women aged 15–34 to avoid truncation bias (caused by the inability to include the experience of women who were 35–49 years old 15 years before the survey); however, this approach tends to underestimate the rate of decline because it excludes data on older women, whose fertility has generally decreased the most.

†The DHS sample for Brazil did not include women aged 45–49; therefore, this number represents children ever born to women aged 40–44.

The Population Wars

(Continued from page 114)

In the debate over development and family planning, Donaldson's heart is clearly with the family planners. He judges the AID program, presumably after changes built on the Ravenholt years, to be "remarkably humane, well designed, effectively implemented, and useful" [p. 176]. And yet, coming down to specifics, he sees "little evidence that Korea genuinely required what the United States had to offer" [p. 151]. He identifies the key factor in the Korean fertility decline as the "growing desire on the part of men and women to avoid the physical and financial burden of too many children" [p. 152], which he in turn attributes to the spread of education. So development, after all, could have been the critical factor.

The patient historian should commit himself, and after painstaking research, favor the reader with some opinion about the effectiveness of opposing tactics. But this is not a dispassionate recounting of the last war (though Donaldson does spend some surprising pages trying to draw parallels between the growth of the population program and the Vietnam buildup). It is closer to a report from the battlefield, with some skirmishes completed and some objectives won but with new battles still to be fought. Thus, the fog of war still hangs over the book's final postmortems.

Note to Authors

International Family Planning Perspectives is a peer-reviewed quarterly journal publishing research articles about the developing world that are intended to be of assistance to professionals in the fields of fertility and family planning, maternal and child health and population policy. The editors invite researchers, policymakers and program operators from around the world to submit articles on such topics as contraceptive practice and research; population growth; fertility levels, trends and determinants; childspacing; pregnancy termination; public policies and legal issues affecting family planning and childbearing; family planning program operation, development and evaluation; information, education and communication activities; sexually transmitted diseases; and reproductive, maternal and child health. Manuscripts should be sent to the address below, and should include the affiliation, address, telephone number and Fax number of the corresponding author.

Manuscripts may be submitted in English, French or Spanish, and are read with the understanding that they neither are under consideration elsewhere nor have been published previously. All submissions are reviewed by the editorial staff and, if deemed of interest, undergo anonymous peer review. Manuscripts not accepted for publication will not be returned. Upon acceptance, all manuscripts are edited to the extent necessary to conform to the style of the journal. Authors will have two opportunities to review their article after editing. Authors must assign copyright to the journal.

Selected articles appear on an annual basis in the Spanish edition of the journal, *Perspectivas Internacionales en Planificación Familiar,* and in the French edition, *Perspectives Internationales sur le Planning Familial.*

Manuscripts should be typed double-spaced, with all pages numbered and with a title page that includes the names and affiliations (at the time of the work reported) of all authors. Submissions should run no more than 30–35 pages, with no more than 7–8 tables; only one copy need be sent. Manuscripts should include a summary of up to one page in length.

Each table and chart should be on a separate page. Authors should check previous issues of *International Family Planning Perspectives* to gain an idea of how tables are to be styled. Authors must supply data points for all line graphs and charts; final art work will be done by the journal's staff.

International Family Planning Perspectives es una revista trimestral que publica monografías sobre el mundo en desarrollo destinadas a asistir a profesionales en las áreas de fecundidad y planificación familiar, salud materno-infantil y políticas de población. Invitamos a investigadores y responsables de políticas y programas de todo el mundo a que presenten artículos sobre temas tales como práctica e investigación en materia de anticonceptivos; crecimiento demográfico; niveles, tendencias y determinantes de la fecundidad; espaciamiento de los hijos; terminación de embarazo; políticas oficiales y cuestiones jurídicas que afecten la planificación familiar y la fecundidad; aplicación, elaboración y evaluación de programas de planificación familiar; actividades de información, instrucción y comunicación; enfermedades transmitidas sexualmente y salud reproductiva y materno-infantil. Los originales deberán enviarse a la dirección que figura abajo, debiendo constar en ellos la filiación completa, domicilio postal, teléfono y, de ser posible, número de Fax del remitente.

Los originales pueden ser escritos en español, francés o inglés. Serán aceptados en la inteligencia de que son inéditos y no están siendo considerados por ninguna otra publicación. El personal de edición examinará todos los trabajos presentados y, de hallarlos interesantes, los hará evaluar por otros especialistas sin divulgar el nombre del autor. No se devolverán los originales rechazados. Los que se acepten serán revisados en la medida necesaria para conformarlos al estilo de la revista. Los autores tendrán dos oportunidades de examinar sus monografías revisadas y deberán ceder los derechos de autor a la revista.

Algunos artículos se seleccionarán para la edición anual en español, *Perspectivas Internacionales de Planificación Familiar,* o para la edición francés, *Perspectives Internationales sur le Planning Familial.*

Los originales deberán presentarse mecanografiados a doble espacio. Las páginas deberán estar numeradas, debiendo figurar en la primera, nombre y filiación (al momento de escribirse el trabajo) de todos los autores. Los artículos no podrán exceder de 30–35 páginas ni incluir más de ocho cuadros. No hace falta enviar sino un ejemplar. Los originales deberán ir acompañados de un resumen de hasta una página.

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La revue trimestrielle *International Family Planning Perspectives* publie des articles présentant des résultats de recherche sur les pays en développement et destinés à éclairer les spécialistes en matière de fécondité, planification familiale, protection maternelle et infantile et politiques démographiques. La rédaction invite tout chercheur, dirigeant ou administrateur de programme à soumettre des articles sur les sujets suivants: pratique contraceptive et recherche dans le domaine de la contraception; croissance démographique; niveaux, tendances et facteurs déterminants de la fécondité; espacement des naissances; interruption de grossesse; questions juridiques et d'ordre public influant sur la planification familiale et la procréation; administration, élaboration et évaluation de programmes de planification familiale; activités relatives à l'information, l'éducation et la communication; maladies sexuellement transmissibles; hygiène sexuelle et comportement reproducteur; et protection maternelle et infantile.

Les auteurs devraient adresser les manuscrits à l'adresse ci-dessous et mentionner l'affiliation complète, adresse, numéro de téléphone et numéro de télécopieur (si possible) de la personne avec qui nous devons communiquer.

Les manuscrits peuvent être rédigés en français, en anglais ou en espagnol et ne seront acceptés qu'à la condition qu'ils n'aient été soumis à aucune autre publication, ni déjà publiés. Tous les articles sont évalués par la rédaction et s'ils sont jugés intéressants, présentés, à titre anonyme, à l'appréciation de spécialistes. Les manuscrits non publiés ne seront pas renvoyés à leur(s) auteur(s). Une fois acceptés, les manuscrits seront éventuellement révisés afin de les adapter au style et présentation propres à la revue. Les auteurs auront ensuite, à deux reprises, l'occasion de revoir leur article. Ils devront céder les droits d'auteur à la revue.

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